SONY

PRO-BETACAM SP CAMCORDER

UVW-100B

UVW-100BP

ELECTRONIC VIEWFINDER

DXF-601

DXF-601CE

ZOOM LENS

VCL-714BX

TRIPOD ATTACHMENT

VCT-U14

SERVICE MANUAL

1st Edition

Power HAD

LITHIUM BATTERY

Replace the battery with a Sony CR2025 lithium battery. Use of another battery may present a risk of fire or explosion.

WARNING

Battery may explode if mistreated.
Do not recharge, disassemble or dispose of in fire.

Note

Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
levér det brugte batteri tilbage til laverandøren.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

SAFETY RELATED COMPONENT WARNING

Component indentified by shading and ⚠ marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

NOTE

This service manual covers only the different parts from UVW-100/100P service manual. Other informations are common to UVW-100/100P service manual. Use this service manual together with the UVW-100/100P service manual.

This Service manual is described the different parts as follows.

BLOCK DIAGRAMS
SCHEMATIC DIAGRAMS AND BOARD LAYOUT
SPARE PATRS AND OPTIONAL FIXTURES

Moreover,the parts of different Block diagrams and Spare parts between UVW-100/100P and UVW-100B/100BP are indicated by broken line to be intelligible.

1. Board difference table

[For NTSC model]

BOARD NAMES		REMARKS
UVW-100	UVW-100B	
DC-62	DC-62A	These boards are no compatible between UVW-100 and UVW-100B.
DC-63	DC-63A	
MB-506	MB-506A	
MB-530(N)	MB-530D(N)	
TC-86	TC-86E	

[For PAL model]

BOARD NAMES		REMARKS
UVW-100P	UVW-100BP	
DC-62	DC-62A	These boards are no compatible between UVW-100P and UVW-100BP.
DC-63	DC-63A	
MB-506	MB-506A	
MB-530(P)	MB-530D(P)	
TC-86A	TC-86G	

2. Equipment difference table

[For NTSC model]

	UVW-100	UVW-100B
ELECTRONIC VIEWFINDER	DXF-501	DXF-601
TRIPOD ATTACHMENT	VCT-U14	VCT-U14
ZOOM LENS	VCL-713BX	VCL-714BX

[For PAL model]

	UVW-100P	UVW-100BP
ELECTRONIC VIEWFINDER	DXF-501CE	DXF-601CE
TRIPOD ATTACHMENT	VCT-U14	VCT-U14
ZOOM LENS	VCL-713BX	VCL-714BX

3. On service information for the DXF-601,DXF-601CE and VCT-U14, see the service manual on below.

- DXF-601/601CE (9-977-229-01)
- VCT-U14 (9-977-221-01)

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SECTION 1
OPERATING INSTRUCTION

This section is extracted from operation manual.

3-856-083-22(1)

SONY

PRO-BETACAM SP Camcorder

UVW-100BK/100BPK
UVW-100BL/100BPL
UVW-100BF/100BPF

Operating Instructions

Before operating the unit, please read this manual carefully, and retain it for future reference.

Power HAD

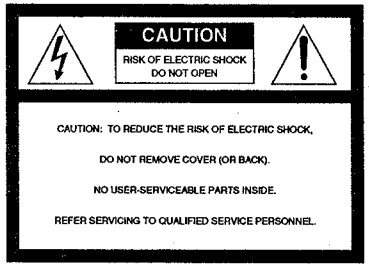
Owner's Record

The model and serial numbers are located on the upper side. Record these numbers in the spaces provided below. Refer to them whenever you call your Sony dealer regarding this product.

Model No. _____ Serial No. _____

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

LITHIUM BATTERY

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WARNING
Battery may explode if mistreated.
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VAROITUS
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Vaihda paristo ainoastaan laitevalmistajan suositteiemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Caution
Television programs, films, video tapes and other materials may be copyrighted. Unauthorized recording of such material may be contrary to the provisions of the copyright laws.

For the customers in the U.S.A.
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

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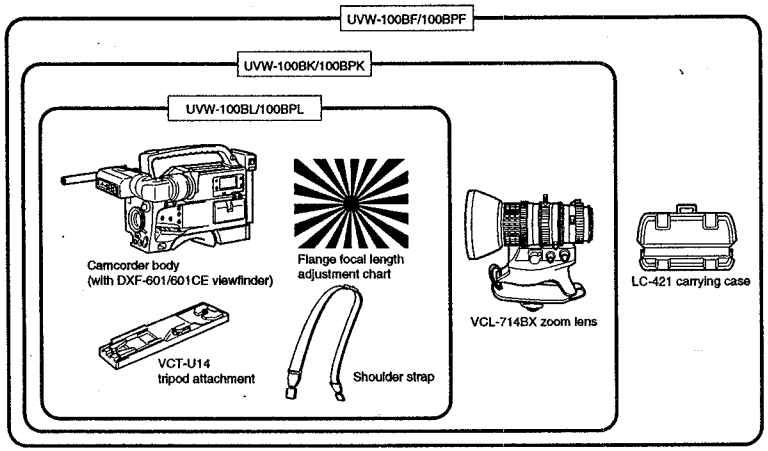
Contents

Chapter 1
Overview

This chapter describes some of the functions and features of the system, and should be read before operating the unit.

System Configuration

The UVW-100BK/100BPK, UVW-100BL/100BPL and UVW-100BF/100BPF Pro-Betacam SP camcorders comprise the units shown in the following figure.



System configuration

Features

The UVW-100BK/100BPK/100BL/100BPL/100BF/100BPF comprises a three-chip color video camera employing an interline transfer Power HAD™ 1) sensor CCD 2) imager with 380,000 (UVW-100BK/100BL/100BF) or 440,000 (UVW-100BPK/100BPL/100BPF) effective picture elements, integrated with a Betacam SP (Superior Performance) series videocassette recorder. This unit is compact and lightweight with no loss of quality over conventional separate camera systems or camcorders. Additional functions enable this unit to be used in an even wider range of locations.
The following are some of the principal features of the unit.

1) **Power HAD:** Power Hole-Accumulated Diode "Power HAD" is a registered trademark of Sony Corporation.

2) **CCD:** charge-coupled device

Camera Features

High image quality Power HAD sensor CCD

The use of an interline transfer Power HAD sensor CCD imager provides high image quality.
- High horizontal resolution (700 lines or more).
- High signal-to-noise ratio (60 dB: UVW-100BK/100BL/100BF, 58 dB: UVW-100BPK/100BPL/100BPF) provides a low-noise picture even with increased video gain.

Superior optical characteristics

The camera provides faithful color reproduction, with high sensitivity (f/11.0 at 2000 lx).

Electronic shutter

- Allows you to shoot fast-moving subjects with little blurring.
- Eliminates flicker when shooting under fluorescent lighting.

Clear Scan ™ 1) function

The Clear Scan function reduces the banding pattern that appears when you shoot a CRT screen such as a computer monitor.

Automatic white balance and black balance adjustment and memory function

- The black set 2), black balance 3) and white balance 4) can be adjusted automatically. The settings are saved in memory and maintained when the unit is powered off.
- The auto tracing white balance (ATW) function automatically sets the white balance to the optimum value for the lighting conditions.

Backlighting correction

The intelligent auto-iris function automatically adjusts the exposure, allowing shooting with the appropriate exposure even with backlit subjects.

1) **"Clear Scan"** is a trademark of Sony Corporation.
2) **Black set:** A reference level for black balance adjustment.
3) **Black balance:** To balance the black level of the R, G, and B signals so that black has no color.
4) **White balance:** Adjustment of R, G and B signal levels, so that white objects are reproduced correctly as true white.

High-performance viewfinder

The viewfinder screen also provides the following adjustment indications and warnings.

- Text displays: show switch settings and warn of misoperations.
- Zebra pattern: can be displayed to facilitate manual iris adjustment.
- Safety zone and center marker: indicate the effective picture area and the screen center.
- Warning indicator: lights or flashes if there is an operating problem when the unit is powered on or during operation.

Selectable video gain

The video amplifier has two increased gain settings, identified as "MID" and "HIGH", and you can set the values to be used for each of these settings to any values from 0 to 18 dB in 1 dB steps.
You can also use the automatic gain control function (AGC) to adjust the gain automatically according to the lighting conditions.

Automatic exposure function

The automatic exposure (AE) function adjusts the electronic shutter speed in steps of $^1/_{15000}$ s.

Wide lighting range

By using the auto iris function, and the AGC and AE functions together, there are a total of 12 exposure settings, to cope with a wide range of lighting conditions. You can also adjust the settings of the ranges.

Simultaneous recording

It is possible to record simultaneously on the built-in VTR and an external VTR such as a BVW-35/35P/50/50P or VO-8800/8800P by using a CCZ or CCZQ cable (not supplied).

VTR Features

Betacam SP format

Superior video and audio characteristics
The Betacam SP format provides superior video and audio characteristics, with excellent signal-to-noise ratio, frequency characteristics, waveform characteristics, and detail reproduction. This offers a leap in both video and audio quality over conventional systems.

Compatibility with other Betacam SP VTRs
Metal tape cassettes recorded with this unit can be played back on any Betacam SP VTR, and a metal tape cassette recorded with any Betacam SP VTR can be played back on this unit.

Recording review function

When the unit is paused, this function allows you to play back the last few seconds of recording, for a quick check.

Built-in time code generator/reader

The time code (LTC) generator/reader is built in, making it easy to record the time code required for precise editing.

High quality audio

- The external microphone supplied uses a 48 V phantom power supply to provide high audio quality.
- In addition to the external microphone supplied, you can connect another external microphone. The 48 V phantom power supply enables a wider selection of microphones to be used.
- The audio on the two longitudinal tracks uses the same Dolby C-type noise reduction [1] as other Betacam SP VTRs. This is always enabled during both recording and playback.

Audio recording level adjustable while looking into the viewfinder (CH-1 only)

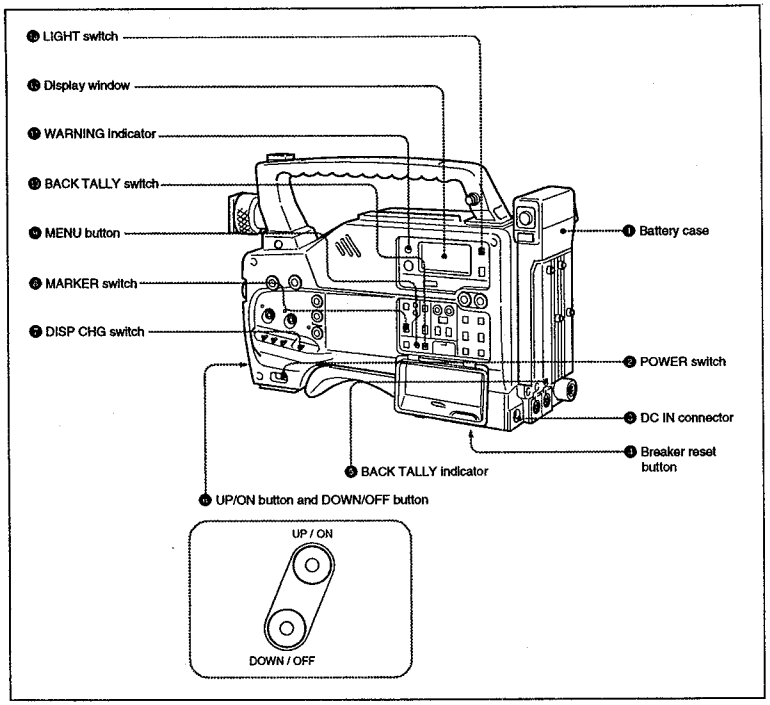
As the shooting condition changes, you can adjust the audio recording level using the knob near the viewfinder while looking at the audio level indication in the viewfinder.

1) Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "DOLBY" and the double-D symbol ⧈ are trademarks of Dolby Laboratories Licensing Corporation.

Chapter 2
Location and Function of Parts

This chapter describes the location and function of the parts of this unit which it is necessary to understand before operating the unit.

Power Supply and Display



Power supply and display

Power supply

❶ Battery case
Insert an NP-1B battery pack (not supplied).

For details of the battery loading procedure, see the section "Using the NP-1B Battery Packs" (page 3-19).

❷ POWER switch
This powers the unit on and off.

❸ DC IN connector (XLR 4-pin, male)
Use a CMA-8A/8ACE camera adaptor or AC-550/550CE AC adaptor to supply power from an outlet to this connector.

❹ Breaker reset button
If an excessive current flows in the internal circuits, the internal circuit breaker is activated, shutting off the camcorder power supply and pushing this button out. If this occurs, check for the cause of the excessive current. For example, check that the camcorder power supply is connected with the correct polarity.
After making sure that there are no power supply problems, push this button in to power the camcorder on again.
If pushing this button in fails to power the camcorder on, refer the problem to qualified Sony service personnel.

Display

❺ BACK TALLY indicator
This lights during recording with the BACK TALLY switch set to ON.
This indicator also flashes to indicate warnings in the same manner as the REC/TALLY indicator in the viewfinder of the video camera.

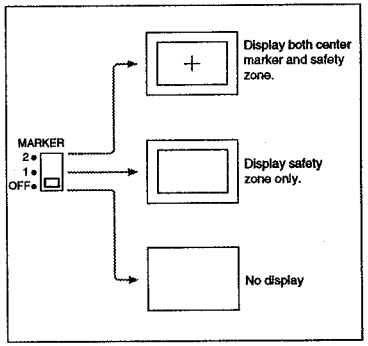
For details about the warning functions of the REC/TALLY indicator, see the section "Warning System" (page 7-2).

❻ UP/ON button and DOWN/OFF button
Used in conjunction with the DISP CHG switch to make camera settings.

❼ DISP CHG (display change) switch
Pushing this switch up or down changes the menu display on the viewfinder screen.

For details, see the section "Indications in the Viewfinder and Display Window" (page 4-9).

❽ MARKER switch
This selects whether to display the center marker and safety zone indication in the viewfinder.



MARKER switch settings

❾ MENU button
Use this button to access the VTR menu, for settings such as date and time, and drop-frame or non-drop-frame (NTSC).

For details see the section "Using the VTR Menu" (page 5-20).

❿ BACK TALLY switch
This switch determines whether or not the BACK TALLY indicator operates.

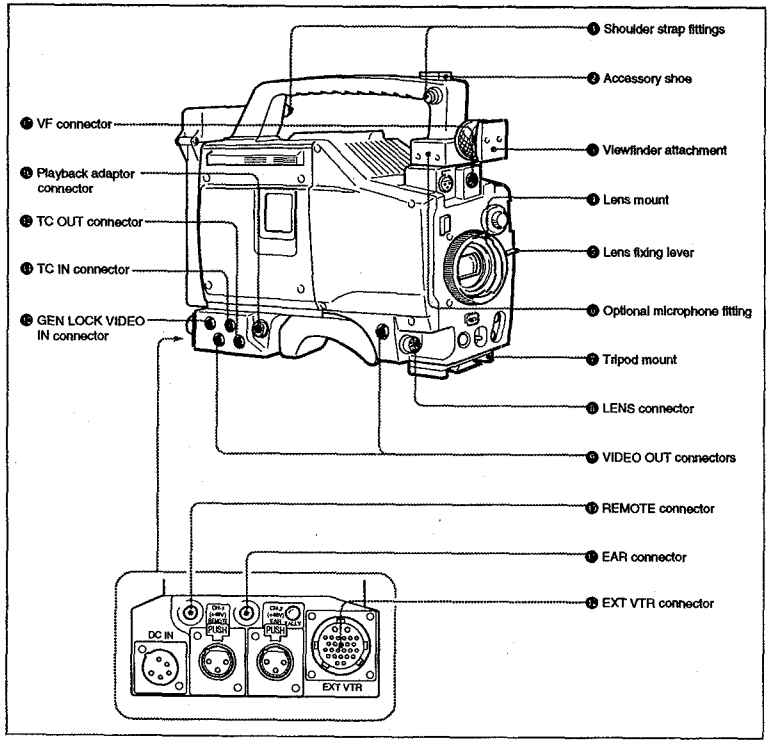
⓫ WARNING indicator
This lights or flashes when there is an operating problem with the unit. This indicator does not work for the VTR connected to the EXT VTR connector.

For details, see the section "Warning System" (page 7-2)

⓬ Display window
This displays time values, audio levels, tape remaining, battery state, non-drop-frame (NDF) indication (for UVW-100BK/100BL/100BF only), warnings, and head drum operating hours.

⓭ LIGHT switch
This turns the display window lighting on or off.

Accessory Fittings and Input/Output Connectors



Accessory fittings and input/output connectors

Accessory fittings

❶ Shoulder strap fittings
Use these to attach the supplied shoulder strap.

❷ Accessory shoe
Use this for attaching an optional accessory such as a video light.

❸ Viewfinder attachment
Attach the supplied DXF-601/601CE viewfinder.

❹ Lens mount
Use this for mounting the VCL-714BX zoom lens (supplied with the UVW-100BK/100BPK/100BF/100BPF) or another zoom lens (not supplied).

❺ Lens fixing lever
After inserting the lens in the lens mount, use this level to turn the lens mounting ring, to fix the lens in place.

❻ Optional microphone fitting
You can attach the optional CAC-12 microphone holder here.

❼ Tripod mount
When using the unit on a tripod, fix the VCT-U14 tripod adaptor supplied to this mount.

Input/output connectors

❽ LENS connector (12-pin, for 2/3-inch lens connection)
Connect the lens cable when using a 2/3-inch lens with the LO-32BMT lens mount adaptor.

❾ VIDEO OUT connectors (BNC × 2)
These output the video signal from the camera.

Note

It is not possible to monitor video being played back or recorded by the built-in VTR using these connectors.

❿ REMOTE connector (mini-jack)
Connect an RM-81 remote control unit (not supplied). This controls starting and stopping of recording. You cannot use this connector to control an external VTR.

Note

Be careful not to confuse the REMOTE and EAR connectors, both of which are mini-jacks.

⓫ EAR connector (stereo mini-jack)
Connect an earphone or headphone. This outputs the sound which was output to the speaker, but mutes the speaker.

⓬ EXT VTR connector (CCZ, 26-pin)
Use a CCZ or CCZQ cable (not supplied) to connect an external VTR. You can then record the same signals on the external VTR as on the built-in VTR.

Note

It is not possible to connect a CCU-M5/M7 camera control unit.

⓭ GEN LOCK VIDEO IN connector (BNC)
When synchronizing the camera to an external signal, input a reference video signal (VBS [1]) or BS [2]) from external equipment to this connector.

⓮ TC (time code) IN connector (BNC)
Input an external signal for synchronizing the built-in time code generator output signal. Use an SMPTE (for NTSC)/EBU (for PAL) longitudinal time code signal.

⓯ TC (time code) OUT connector (BNC)
Outputs the time code signal from the built-in time code generator. When a signal is input to the TC IN connector, this output signal is synchronized to it.

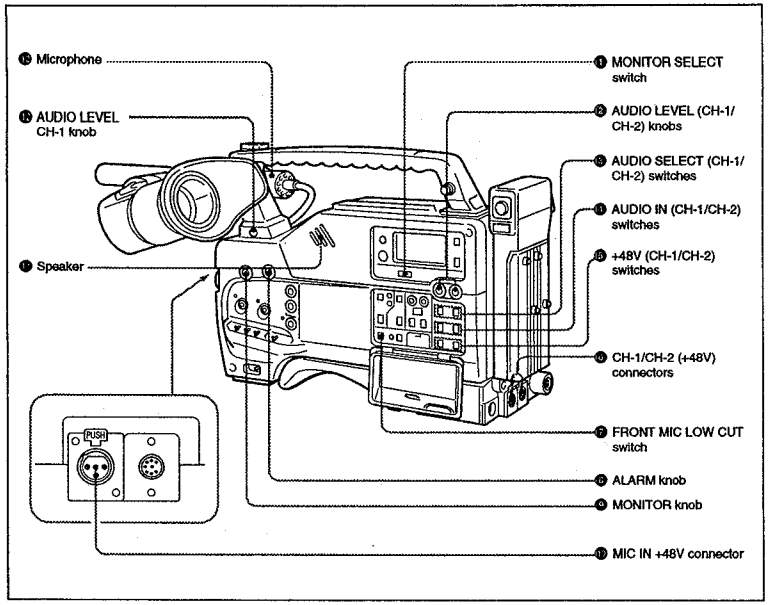
⓰ Playback adaptor connector (round, 20-pin)
For color playback monitoring from the built-in VTR, connect a VA-300/300P/500/500P playback adaptor (not supplied) to this connector.

⓱ VF (viewfinder) connector (8-pin)
Connect the viewfinder connector.

1) **VBS:** Video, Burst and Sync

2) **BS:** Burst and Sync

Audio Functions



Audio functions

❶ MONITOR SELECT switch

This selects the audio output to the speaker or earphones.

CH-1: channel 1 audio
MIX: channels 1 and 2 mixed
CH-2: channel 2 audio
EXT VTR: the sound selected by an external VTR connected to the EXT VTR connector

❷ AUDIO LEVEL (CH-1/CH-2) knobs

When the AUDIO SELECT (CH-1/CH-2) switches are set to MANUAL, these knobs adjust the audio recording levels on the corresponding channels.

The audio levels are shown in the display window. For details, see the section "Indications in the Display Window" (page 4-17).

❸ AUDIO SELECT (CH-1/CH-2) switches

These select the audio level adjustment method for each of channels 1 and 2.

AUTO: Use the AGC circuit to adjust the audio level automatically.
MANUAL: Adjust the audio level manually, using the AUDIO LEVEL (CH-1/CH-2) knobs. There is a limiter circuit to prevent excess levels, thus allowing recording with low distortion.

❹ AUDIO IN (CH-1/CH-2) switches

These select the input signals to audio channels 1 and 2.

FRONT: The signal from the microphone connected to the MIC IN +48V connector
REAR MIC: The signal from a microphone connected to the CH-1/CH-2 (+48V) connectors
REAR LINE: The line signal connected to the CH-1/CH-2 (+48V) connectors

❺ +48V (CH-1/CH-2) switches

These switches control the 48 V power supply to the CH-1/CH-2 (+48V) connectors. When one of these switches is on, the corresponding one of the AUDIO IN (CH-1/CH-2) switches should be set to REAR MIC, and the corresponding connector can be used for a microphone requiring a 48 V supply.

Note

If you connect a microphone not compatible with a 48 V supply to one of the CH-1/CH-2 (+48V) connectors while the corresponding one of the +48V (CH-1/CH-2) switches is in the ON position, the microphone may be damaged. Check the power supply used by the microphone and the switch settings before making the connection.

❻ CH-1/CH-2 (+48V) connectors (XLR 3-pin, female)

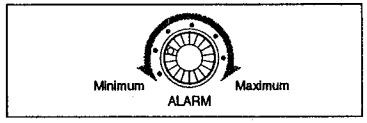
Connect a microphone or external equipment to each of these connectors.
When using a signal input to either of these connectors, set the corresponding AUDIO IN (CH-1/CH-2) switch to REAR MIC or REAR LINE, depending on the equipment connected.

❼ FRONT MIC LOW CUT switch

This applies a high-pass filter to the input from the microphone connected to the MIC IN +48V connector. This reduces wind noise.

❽ ALARM knob

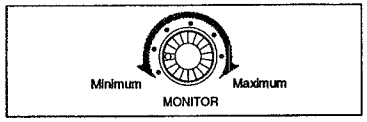
This controls the volume of the warning sound given on the speaker or from the EAR connector. On the minimum setting, the warning sound is not audible at all.



ALARM knob

❾ MONITOR knob

This controls the volume of the sound other than the warning on the speaker or from the EAR connector. On the minimum setting, the sound is not audible at all.



MONITOR knob

❿ MIC IN +48V connector (XLR 3-pin, female)

Connect the supplied microphone (or another microphone).

Note

This connector is for a microphone using a 48 V phantom power supply only. Using a microphone not designed to use a +48 V phantom power supply may result in damage.

⓫ Speaker

During recording the speaker relays the input audio signal in E-E mode [1], and during playback it outputs the playback audio. The speaker also sounds a warning tone when there is an error indication in the viewfinder or display window.
If an earphone is connected to the EAR connector, the speaker does not sound.

For details of the warning tone, see the section "Warning System" (page 7-2).

⓬ AUDIO LEVEL CH-1 knob

When the AUDIO SELECT (CH-1) switch is set to MANUAL, this knob as well as the AUDIO LEVEL (CH-1) knob adjusts the audio recording level on audio channel 1.

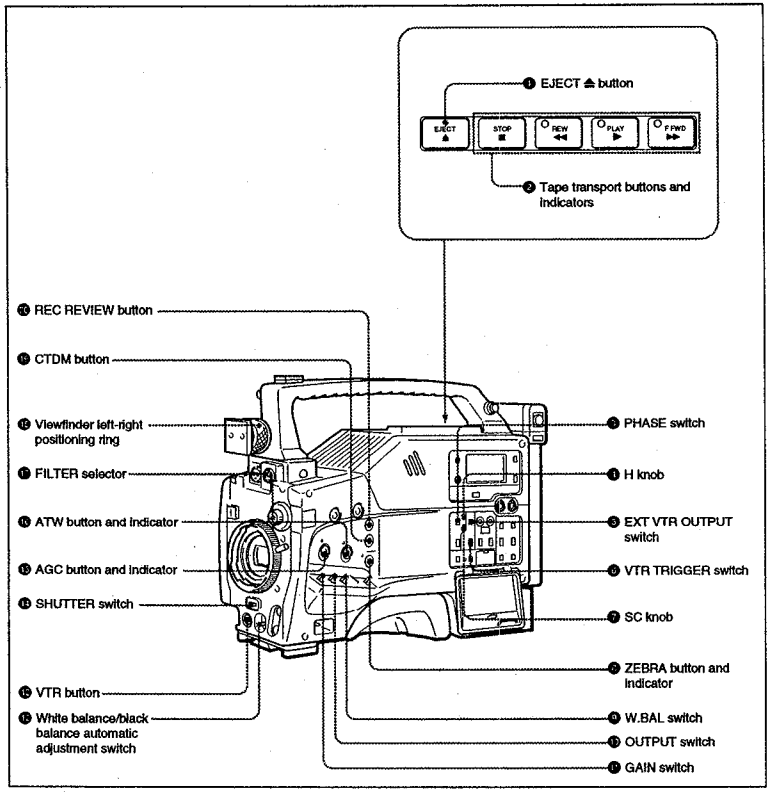
⓭ Microphone

This is a directional microphone, using a +48 V phantom power supply.

1) **E-E mode:** Electric-to-Electric mode. The input signals which pass through the recorder's electronics are supplied from the output connectors.

Chapter 2

Shooting and Recording/Playback Functions



Shooting and recording/playback functions

❶ EJECT ⏏ button
Press this button to open the cassette holder.

❷ Tape transport buttons and indicators
These control the tape transport as follows.
REW ◀◀: Rewinds the tape. While the tape is being rewound, the indicator lights.
F FWD ▶▶: Fast forwards the tape. While the tape is being fast forwarded, the indicator lights.
PLAY ▶: Plays back the recorded video. During playback, the indicator lights.
STOP ■: Stops the tape

Note

During recording, none of these buttons operates.

❸ PHASE switch
Select 0° or 180° for the subcarrier [1] phase setting to synchronize the camera with an external synchronization signal input to the GEN LOCK VIDEO IN connector.

❹ H (horizontal) knob
Use to adjust the relative horizontal phases of an external signal and the video output of the camera.

❺ EXT (external) VTR OUTPUT switch
Use this switch to select the output video signal according to the type of external VTR connected to the EXT VTR connector.
1: component output or VBS output
2: Y/C output

❻ VTR TRIGGER switch
When an external VTR is connected to the EXT VTR connector, use this switch to select the effect of the VTR button on the camera and the VTR button on the VCL-714BX zoom lens.
PARALLEL: Pressing either of the VTR buttons starts or stops both the built-in VTR and the external VTR.
INT ONLY: Pressing either of the VTR buttons starts or stops the built-in VTR only. You can operate the external VTR independently.
EXT ONLY: Pressing either of the VTR buttons starts or stops the external VTR only.

Note

This switch only takes effect when there is an external VTR connected to the EXT VTR connector, and powered on. In all other cases, this switch has no effect on the operation of the VTR button on either the camera or the VCL-714BX zoom lens.

❼ SC (subcarrier) knob
Use to adjust the relative subcarrier phases of an external signal and the video output of the camera.

❽ ZEBRA button and indicator (green)
To display the zebra pattern, press this button. When making manual iris adjustment, adjust the iris until the zebra pattern appears on the most important part of the image (for example, the face of a person interviewed against strong backlighting).

❾ W.BAL (white balance) switch
This switch selects the method of white balance adjustment.
PRE: Adjust the white balance to the factory preset color temperature[2] value (3200 K or 5600 K) corresponding to the setting of the FILTER selector.
A or B: Use one of these settings for automatic white balance adjustment.
Pushing the white balance / black balance automatic adjustment switch to the WHT position carries out automatic white balance adjustment, and stores the value obtained in the corresponding memory, A or B.

Note

When the ATW indicator is lit, the ATW function operates regardless of the position of this switch.

❿ OUTPUT switch
This selects the output signal of the camera.
BARS: Outputs a color bar signal.
CAM: Outputs the signal from the camera.

⓫ GAIN switch
This selects the gain of the camera video circuits.
0dB: Normal video gain. The switch should normally be left in this position.
MID: Increase the gain to the current "MID" setting (default value +9 dB).
HIGH: Increase the gain to the current "HIGH" setting (default value +18 dB).

For details, of the "MID" and "HIGH" settings, see the section "Gain settings" (page 5-3).

1) **Subcarrier:** Color information contained in a composite video signal.

2) **Color temperature:** The color quality of lights, expressed in Kelvins (K). Color temperature is higher when the color is reddish and lower when bluish.

⑫ White balance / black balance automatic adjustment switch

Carries out automatic adjustment of the white balance and black set and black balance.

WHT: Carries out automatic white balance adjustment. When the W.BAL switch is in the A or B position, this also stores the value obtained in the corresponding memory, A or B.

BLK: Carries out automatic black set and black balance adjustment and stores the value obtained in memory. The W.BAL switch position has no effect.

⑬ VTR button

Starts and stops recording.

⑭ SHUTTER switch

Enables and disables the electronic shutter and clear scan function.

ON: Enables the electronic shutter and clear scan function. Set the SHUTTER switch to this position also when selecting the shutter speed, or the scanning frequency for the clear scan function.

OFF: Disables the electronic shutter and clear scan function. (Normally leave in this position.)

⑮ AGC (automatic gain control) button and indicator (orange)

For automatic gain control according to the lighting conditions, press this button.

For details of the AGC function, see the section "Automatic gain control" (page 5-4).

⑯ ATW (auto-tracing white balance) button and indicator (orange)

Press this button to enable the ATW function. This automatically adjusts the white balance in conditions where the lighting source is continually changing.

For details of the ATW function, see the section "Using the ATW function" (page 3-30).

⑰ FILTER selector

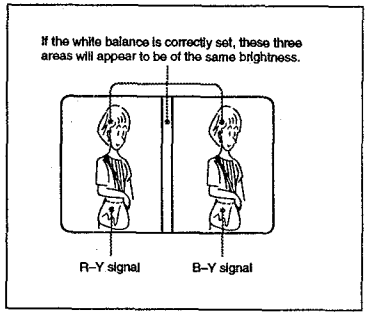
Turn this to select the appropriate internal filter for the lighting conditions.

⑱ Viewfinder left-right positioning ring

Loosen this ring to move the viewfinder to the right or left.

⑲ CTDM button

This is for CTDM [1] playback. To check the color difference signals during playback, hold down this button. The R–Y and B–Y signals appear in monochrome on the left and right halves of the split screen.



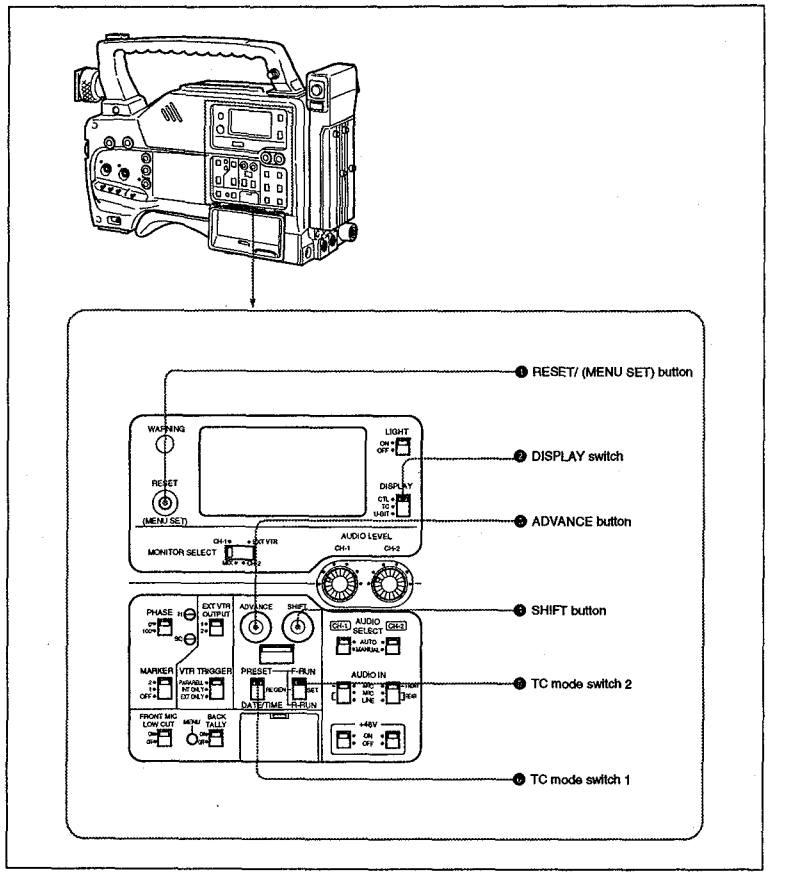
Checking the color difference signals

⑳ REC REVIEW button

Press this button to review the last few seconds of the recording.

1) **CTDM:** Compressed Time Division Multiplex. Because the two color difference signals (R–Y and B–Y) have a much smaller bandwidth than the luminance signal, they can be compressed by a factor of two in time, and multiplexed into a single signal.

Time Code Functions



Time code functions

Time Code Functions

❶ RESET/(MENU SET) button

This resets the counter indication shown in the display window. The effect of this button depends on the settings of the DISPLAY switch and TC mode switch 1 and 2, as shown in the following table.

RESET/(MENU SET) button effect

Switch settings	RESET/(MENU SET) button effect
DISPLAY: CTL	Resets the CTL count to "00:00:00:00".
DISPLAY: TC TC mode 1: PRESET TC mode 2: SET	Resets the time code value to "00:00:00:00".
DISPLAY: U-BIT TC mode 1: PRESET TC mode 2: SET	Resets the user bit[a] value to "00 00 00 00".

a) User bits: A 32-bit section of time code in which a user can record necessary information.

This button is also used to change settings in the VTR menu.

For details of the VTR menu, see the section "Using the VTR Menu" (page 5-21).

❷ DISPLAY switch

This selects the value to be shown in the time value indication in the display window.

CTL: Shows a count of the playback or recording CTL (control) signal pulses expressed in hours, minutes, seconds and frames.

TC: Shows the SMPTE (for NTSC)/EBU (for PAL) time code value.

U-BIT: Shows the user bit value within the SMPTE (for NTSC)/EBU (for PAL) time code.

For details of the display window indications, see the section "Indications in the Display Window" (page 4-17).

❸ ADVANCE button

When setting time code and user bit values, pressing this button increments the digit selected with the SHIFT button.

❹ SHIFT button

When setting time code and user bit values, press this button to select the digit to be incremented with the ADVANCE button.
The selected digit flashes.

For details of the method of setting time code and user bit values, see the sections "Setting the Time Code Value" (page 6-2) and "Setting the User Bit Value" (page 6-5), respectively.

❺ TC (time code) mode switch 2

This switch determines the way in which time code values advance when TC mode switch 1 is set to PRESET.

R-RUN: The time code advances only during recording. Consecutive recordings on the tape have consecutive time code values.

SET: Set the switch to this position to set the time code or user bit value.

F-RUN: Free-run mode. The time code advances continuously, whether or not the VTR is recording. Thus the time code value can be aligned with real time.

Note

In NTSC systems, there are two time code operation modes: drop-frame (DF) and non-drop-frame (NDF). The unit (UVW-100BK/100BL/100BF) is shipped with drop-frame mode selected.

For details of how to select drop-frame or non-drop-frame mode, see the section "Selecting drop-frame/non-drop-frame mode (NTSC)" (page 5-23), and for the meanings of these modes, see the section "Drop-frame mode (NTSC only)" (page 6-4).

❻ TC (time code) mode switch 1

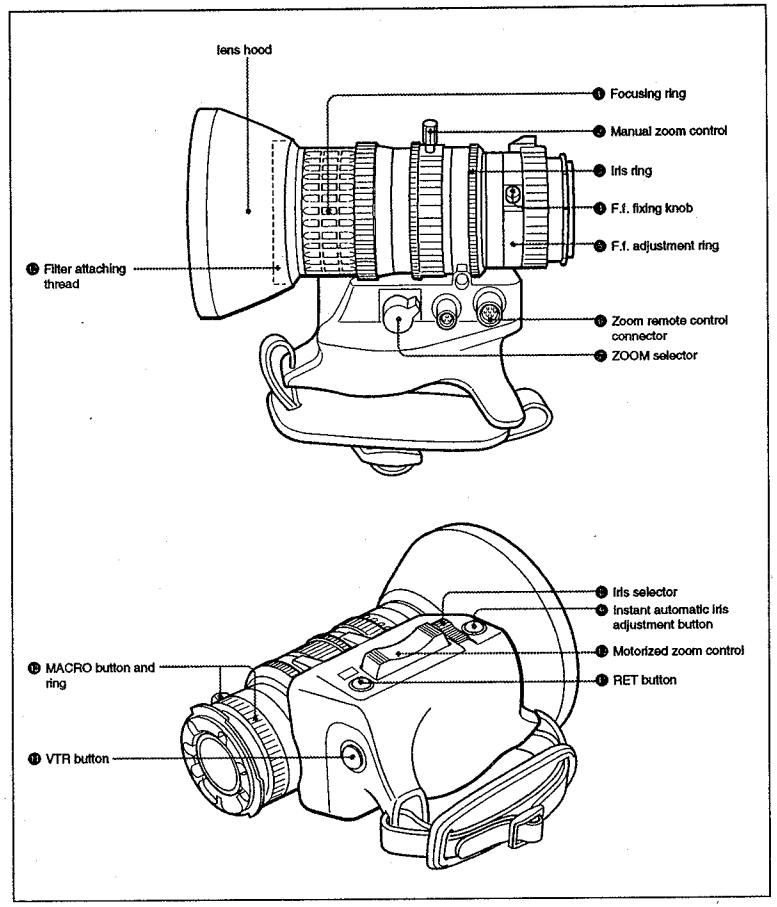
This switch determines whether the time code for a recording is made continuous from the previous recording on the tape, or starts afresh.

REGEN: Reads the existing time code on the tape, and sets the time code starting value accordingly. Thus, even when there is an indefinite break in recording, this setting ensures that time codes on the tape will be continuous. Regardless of the setting of TC mode switch 2, in this position the unit is always in R-RUN mode.

PRESET: Starts recording time code values on the tape from the currently set value.

DATE/TIME: This synchronizes the time code to the real time clock (set in the VTR menu). In this case the time code is recorded in drop-frame mode (NTSC).

VCL-714BX Zoom Lens



VCL-714BX zoom lens

VCL-714BX Zoom Lens

❶ Focusing ring
Turn this ring to focus the lens.

❷ Manual zoom control
Turn this control to control the zoom when the ZOOM selector is set to M.

❸ Iris ring
When the iris selector is set to M, turn this ring to adjust the iris manually. Manual iris adjustment is useful, for example, when shooting against backlighting.

❹ F.f. (flange focal length) fixing knob
Fixes the F.f. adjustment ring.

❺ F.f. adjustment ring
To adjust the flange focal length (the distance from the flange to the focal plane of the lens), release the F.f. fixing knob, then turn the ring.

❻ Zoom remote control connector (8-pin)
For remote control of the zoom, connect an LO-26 lens remote control unit (not supplied).

❼ ZOOM selector
Selects the method of zoom operation.
S: motorized zoom control
M: manual zoom control

❽ Iris selector
Selects the method of iris adjustment.
A: automatic adjustment
M: manual adjustment

❾ Instant automatic iris adjustment button
When the iris selector is set to M, pressing this button switches to automatic iris adjustment. While the button is pressed, the iris is adjusted automatically; when you release it, the iris setting is preserved but the camera returns to manual adjustment.

❿ Motorized zoom control
When the ZOOM selector is set to S, use this control to operate the zoom lens. Press the appropriate end of the control to zoom in or out.
W (wide angle): zoom out.
T (telephoto): zoom in.
The control is pressure sensitive: the harder you press, the faster the lens zooms. If the subject is in focus in the telephoto position, it will remain in focus when you zoom out to wide angle.

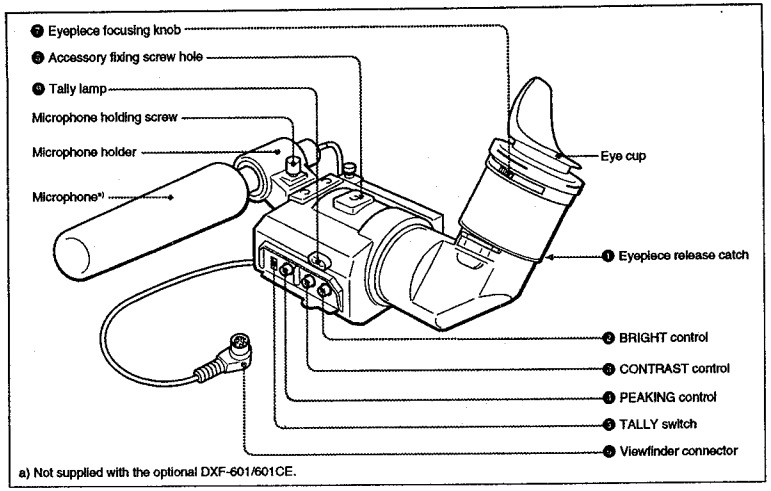
⓫ RET (return) button
Press this button to view the return video from an external VTR connected to the EXT VTR connector in the viewfinder.

⓬ Filter attaching thread
Use to attach a commercially available threaded filter (72 mm dia., 0.75 mm pitch).

⓭ MACRO button and ring
For close-ups, use these button and ring as follows:
① Turn the ring fully toward the arrow while pulling the button toward the mount.
② Set the focusing ring to the minimum object distance.
③ Focus the lens by zooming.
To cancel close-ups, turn the ring in the reverse direction until the button returns to the original position.

⓮ VTR button
Starts and stops recording. This button has the same effect as the VTR button on the camera body.

DXF-601/601CE Viewfinder



DXF-601/601CE Viewfinder

❶ Eyepiece release catch
To view the viewfinder screen directly, press this catch, and hinge up the eyepiece.

❷ BRIGHT (brightness) control
This adjusts the brightness of the viewfinder image.

❸ CONTRAST control
This adjusts the contrast of the viewfinder image.

❹ PEAKING control
This adjusts the outline intensity of the viewfinder image

❺ TALLY switch
Set this switch to the ON position to use the tally lamp.

❻ Viewfinder connector
Connect this to the VF connector on the camera head.

❼ Eyepiece focusing knob
Turn this to adjust the viewfinder focus to match your eyesight.

❽ Accessory fixing screw hole
Attach optional video lights or other accessories here.

❾ Tally lamp
When the TALLY switch is in the ON position, this operates in the same way as the REC/TALLY indicator.

CAUTION
- Do not leave the viewfinder so that sunlight can enter the eyepiece lens.
  It is possible for sunlight focused by the eyepiece to cause very high temperatures, and melt the inside of the viewfinder.
- When the eyepiece is hinged up, be careful not to look through it at the sun. This can cause serious injury.
- Also take care when the eyepiece is hinged up not to leave it in sunlight so that the rays of the sun could be focused on your body or the surface of any object.
- Do not use the viewfinder in strong magnetic fields. This can distort the picture on the viewfinder screen.

Chapter 3
Setting Up the Unit

This chapter describes the preparations for using the unit, including the fitting of accessories and connections required for shooting.

Notes on Operation

Safety Notes

Power supply
The unit operates on a 12 V DC supply. Use only the specified power supplies.

Do not disassemble
The unit includes precision components: do not attempt to disassemble it, as this can lead to malfunction. The viewfinder also contains high voltage components with a danger of electric shock.

Foreign bodies
Be careful not to let any foreign bodies, especially metallic objects or water, get inside the unit, as this can lead to malfunction.

Looking After the Unit

Zoom lens
If the zoom lens is not correctly attached to the camera body it can be damaged. Follow the mounting instructions in the section "Mounting the Lens" *(page 3-5)* carefully.

Do not cover with cloth
While the camera is in operation, do not cover it with a cloth or other material. This can cause the temperature to rise, leading to a malfunction.

Use and storage locations
Avoid using or storing the unit in the following places:
- Where it is subject to extremes of temperature (outside 0 °C to 40 °C) (32 °F to 104 °F).
  Note that in summer the temperature in a car with the windows closed can reach 50 °C (122 °F).
- Very damp or dusty places.
- Where rain is likely to reach the camera.
- Places subject to severe vibration.
- Near strong magnetic fields such as radio or TV transmitters.

Viewfinder
See the cautions on handling the viewfinder on pages 2-15.

After use
Turn the power switch off.

When not used for a period of time
Remove the battery pack.

Shipping
When transporting the unit, as far as possible use either the carrying case or the original packing.
If shipping the unit as freight by truck, ship or airplane, pack it in the carrying case, then pack the carrying case in its own packing or similar.

Care
Remove dust from optical surfaces of the lens and filters with a blower brush. If the body of the unit is dirty, wipe it with a dry cloth. For severe dirt, use a soft cloth steeped in a small amount of neutral detergent, then wipe dry. Do not use volatile solvents such as alcohol or thinners, as these may damage the finish.

In the event of problems
Contact your local Sony service representative.

Condensation

If you move the unit suddenly from a very cold place to a warm place, or use it in a very humid location, condensation may form on the head drum. If the unit is operated in this state, the tape may adhere to the drum, and cause a failure or even permanent damage. Take the following steps to prevent this from happening:
- Remove the cassette before moving the unit from a very cold place to a warm place.
- Before inserting a cassette, turn the power on, and check that the HUMID indication is not showing in the display window. If it is showing, condensation is present: do not insert a cassette, and wait until the condensation has disappeared. At this point the condensation will evaporate more rapidly if you leave the unit powered on.
- If condensation occurs while a cassette is loaded, the unit stops operating. Press the EJECT button to remove the cassette, and wait until the HUMID indication disappears.
- Once condensation has occurred, it may take a considerable time before the unit can be operated. As far as possible, keep the unit in a place at normal temperature and low humidity.

For details of cassette insertion and removal, see the section "Inserting and Removing the cassette" (page 4-3), and for details of the HUMID indication, see the section "Warning System" (page 7-2).

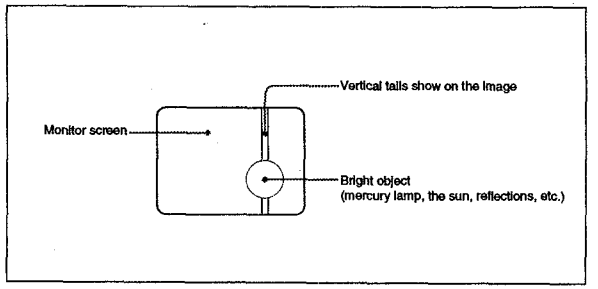
Notes on Operation

CCD Camera Imaging Characteristics

The following phenomena are typical of the operation of a CCD imager, and do not indicate a malfunction.

Smear

Smear produces vertical streaks, and tends to be produced when an extremely bright object is being shot.



Vertical smear

White dots

White dots may appear in the image if the unit is operated at very high temperatures.

Aliasing

When patterns of stripes or lines are shot, they may appear jagged.

Picture quality using the electronic shutter

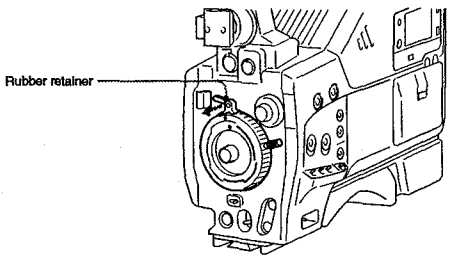
If you are using the electronic shutter with the gain set to a high value (such as 18 dB), the picture quality may be impaired. As far as possible use the electronic shutter only under lighting conditions where you can obtain a clear picture with the GAIN selector set to the 0 dB position.

Attaching Accessories

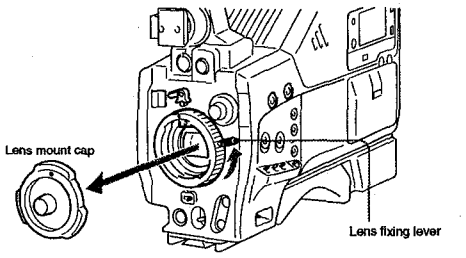
Mounting the Lens

For the UVW-100BK/100BPK/100BF/100BPF, use the supplied VCL-714BX zoom lens. In other cases, before mounting the lens, check that it is appropriate for a Sony 1/2-inch bayonet mount.

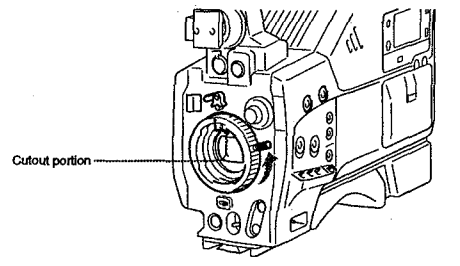
1 Using your fingers, pull off the rubber retainer which prevents the lens mount from turning.



2 Push up the lens fixing lever and remove the lens mount cap from the lens mount.



3 Turn the lens fixing lever fully counterclockwise.



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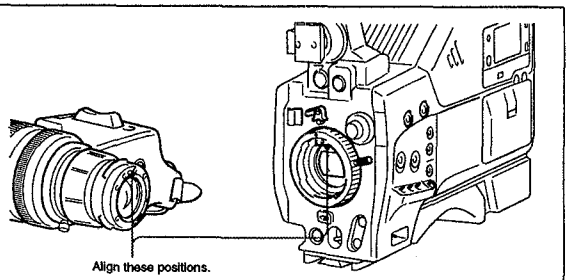
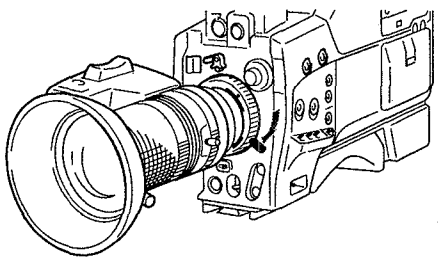
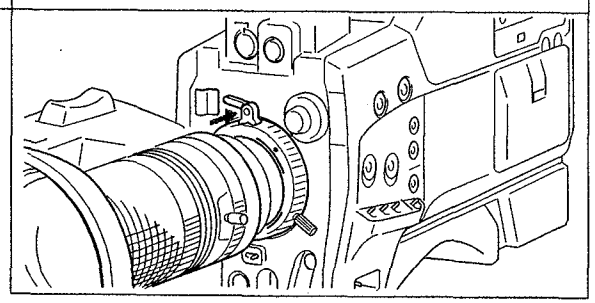
4 Align the lens with the lens mount, and insert the lens into the mount.



5 Supporting the lens, push down the lens fixing lever and turn the ring firmly to fix the lens.



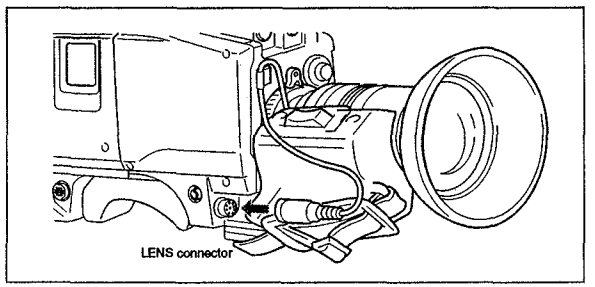
6 Replace the rubber retainer.



Mounting a 2/3-inch lens

It is not possible to mount a 2/3-inch lens directly. It is necessary to obtain an LO-32BMT lens mount adaptor.

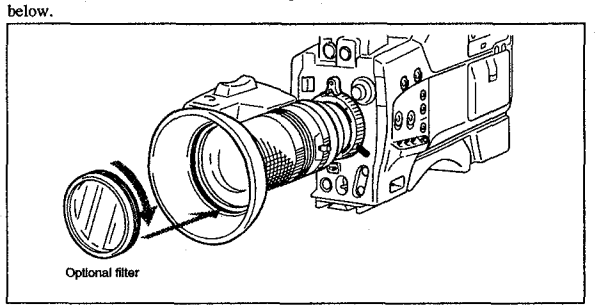
After completing steps **1** to **6** of the procedure above, fit the lens cable to the LENS connector.



Connecting the lens cable

Using optional filters

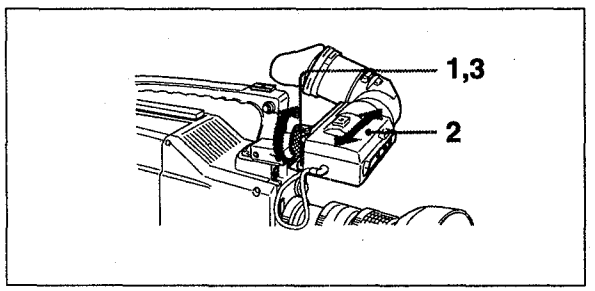
An optional filter (72 mm dia., 0.75 mm pitch) can be fitted to the lens as shown below.



Fitting an optional filter

Adjusting the Viewfinder Position

Adjusting to left or right



Adjusting to left or right

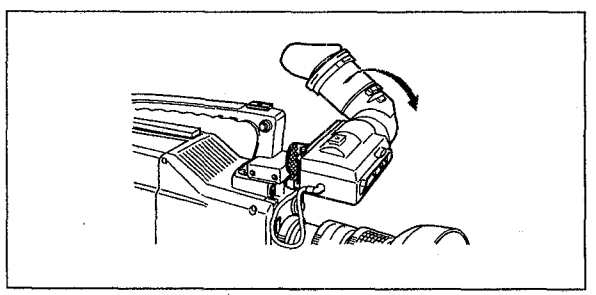
1 Loosen the viewfinder left-right positioning ring.

2 Slide the viewfinder sideways to the most convenient position.

3 Tighten the viewfinder left-right positioning ring.

Adjusting the position vertically

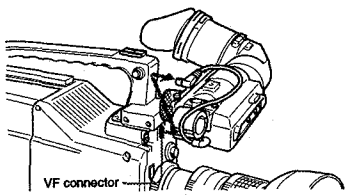
Move the eyepiece to adjust the vertical position.



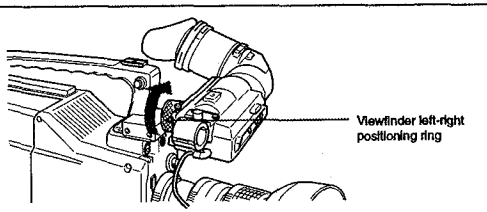
Adjusting the vertical position

Detaching the Viewfinder

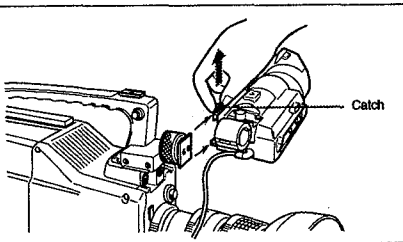
1 Remove the viewfinder connector from the VF connector of the camcorder, and remove the viewfinder cable from the cable clamp.



2 Loosen the viewfinder left-right positioning ring.



3 Pull the viewfinder out sideways, pulling up the catch.



Fitting the viewfinder

Reverse the above procedure. (The catch need not be pulled up.)

When using this unit in a studio, for example, you can replace the supplied DXF-601/601CE 1.5-inch viewfinder by the optional DXF-40B/40BCE 4-inch viewfinder or DXF-50B/50BCE 5-inch viewfinder. For how to fit the optional viewfinder, refer to the operating instructions supplied with the optional viewfinder.

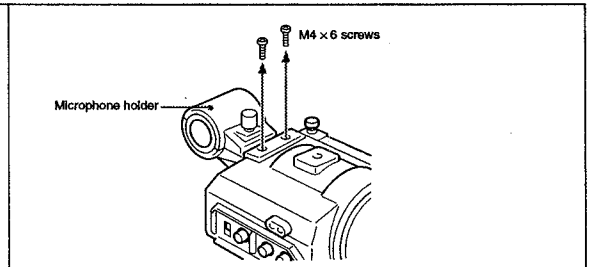
Mounting an Optional Microphone

To use a long microphone such as the ECM-672 (not supplied), first remove the supplied microphone holder, then fit a CAC-12 microphone holder (not supplied).

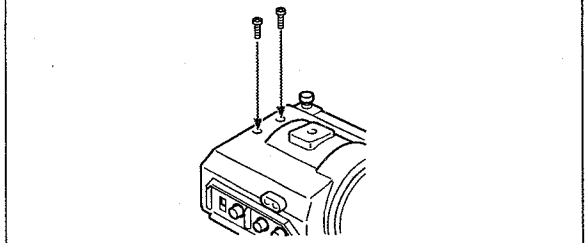
Removing the supplied microphone holder

Use the following procedure to remove the supplied microphone holder from the end of the viewfinder.

1 Remove the two microphone holder retaining screws (M4 × 6) from the viewfinder, then remove the microphone holder.

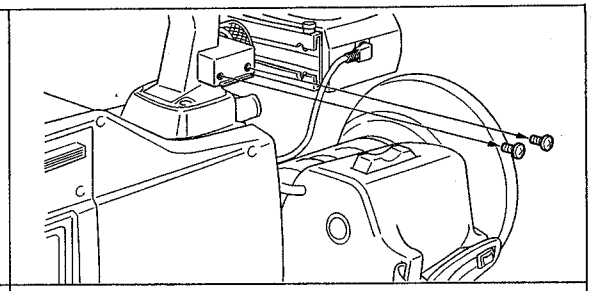


2 Replace the screws in their original positions.

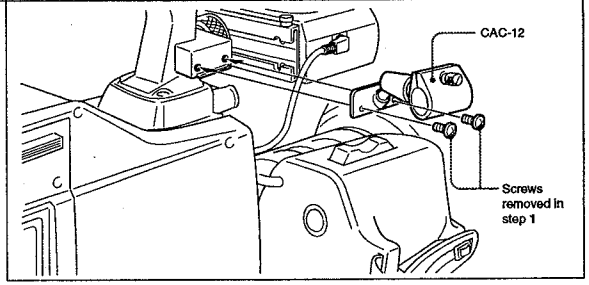


Fitting the optional CAC-12 microphone holder

1 Remove the two screws from the optional microphone fitting.

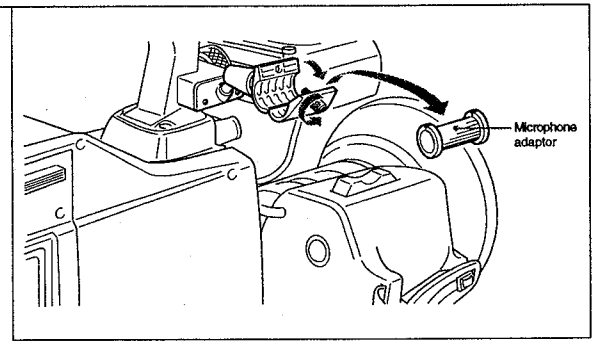


2 Use the two screws to fasten the CAC-12 microphone holder.



Attaching the microphone

1 Undo the microphone holder fastening screw, then open the microphone holder and remove the microphone adaptor.



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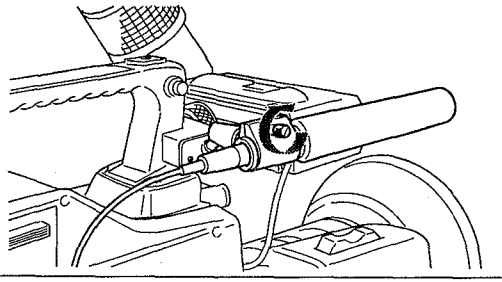
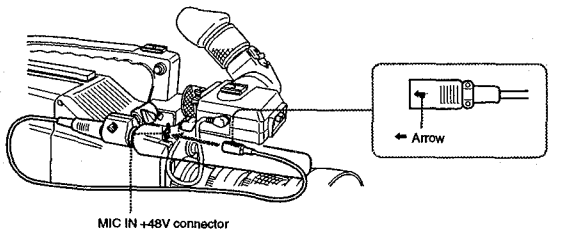
Attaching Accessories

2 Insert the microphone in the microphone holder, then close the holder and tighten the screw.



3 Insert the microphone connector into the MIC IN +48V connector, aligning the arrow uppermost, and fasten the cable with the clamp.



Detaching the microphone

Reverse the above procedure for attaching the microphone.
When removing the microphone connector from the MIC IN +48V connector, press in the button on the top of the connector.

Storing the unit in the carrying case

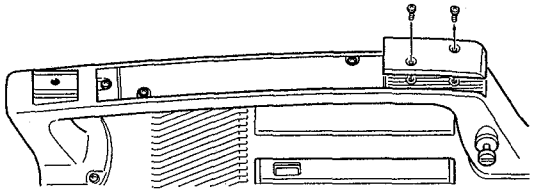
The unit fits in the carrying case with the microphone in place.
If, however, you are using an optional microphone with the CAC-12 microphone holder, before stowing the unit, slacken the microphone fixing screw, lower the microphone, and retighten the screw.

Mounting a Video Light

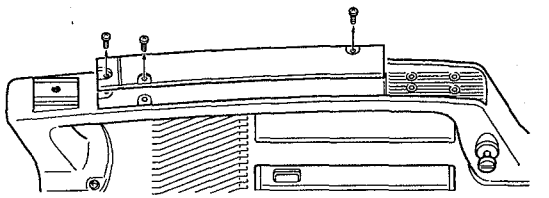
If you mount a video light on the accessory shoe at the front of the carrying handle, you can use the following procedure to pass the power cable for the light through the carrying handle.

For details of how to fit the video light to the accessory shoe and the necessary power connections, refer to the operating instructions supplied with the light.

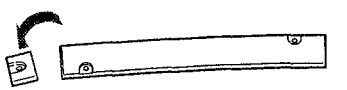
1 Remove the cover at the rear end of the carrying handle.



2 Remove the cover at the front end of the carrying handle.



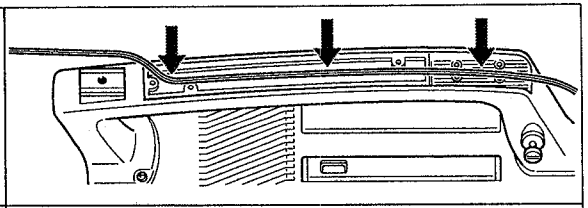
3 Bend the front end of the cover removed in step **2** to break it off at the scored line.



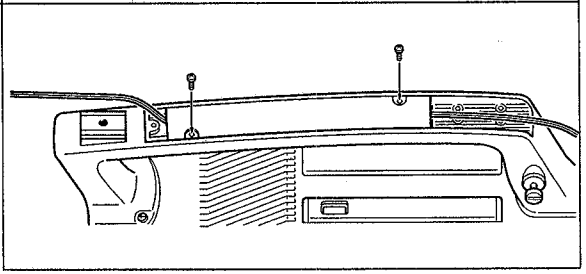
(Continued)

Attaching Accessories

4 Lay the video light power cable in the slot along the top of the carrying handle.



5 Ensuring that the power cable is neatly tucked into place in the slot, replace the cover removed in step **2**, and fasten with screws. (When using a video light in this way, the rear cover removed in step **1** is not used.)

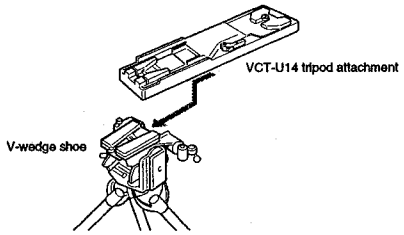


Tripod Mounting

Use the VCT-U14 tripod attachment to mount the camcorder on a tripod.

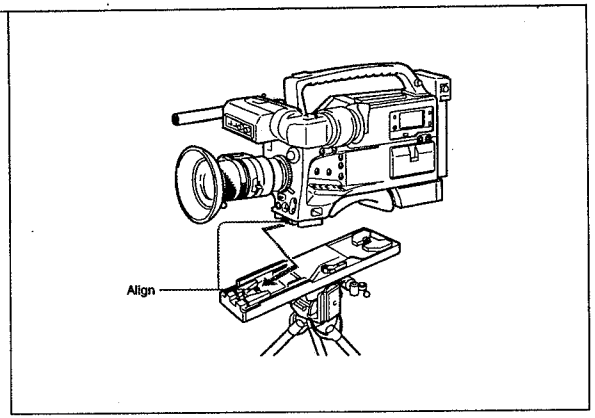
Mounting the tripod attachment on a tripod

1 Attach the supplied V-wedge shoe to the tripod, then insert the tripod attachment into the V-wedge shoe.



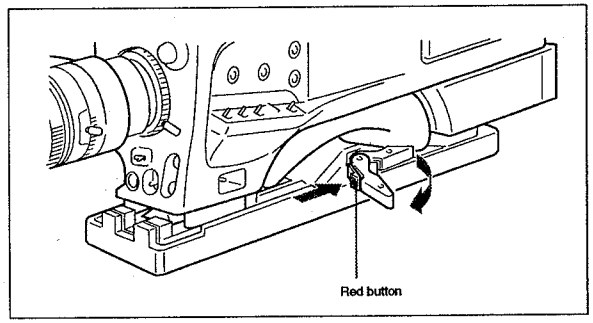
If there is no V-wedge shoe for the tripod, select the screw hole in the tripod attachment which gives the best balance for the camcorder, and use a fixing screw of an appropriate size to fix the tripod attachment to the tripod.

2 Align the projection on the bottom of the camcorder with the groove in the tripod attachment, then slide the camcorder forward along the groove in the tripod attachment until it clicks into place.



Detaching the camcorder from the tripod attachment

Holding down the red button on the tripod attachment, push the lever forward in the direction of the arrow, to unlock the camcorder. Then slide the camcorder back to remove from the tripod attachment.

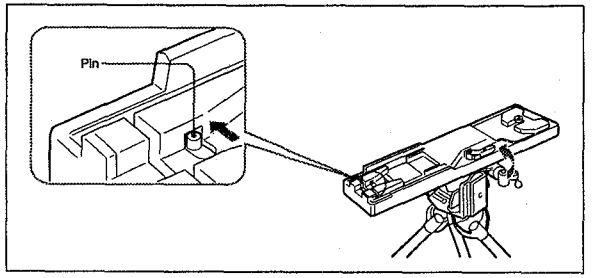


Detaching the camcorder from the tripod attachment

Attaching Accessories

Check after removing the camcorder

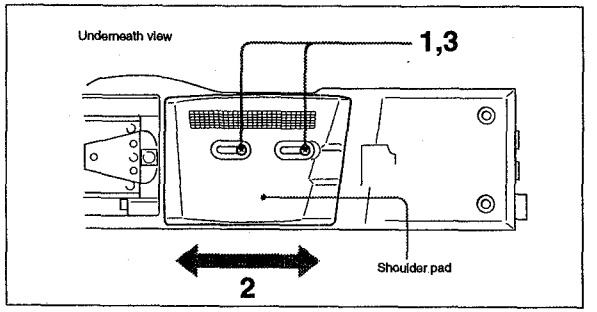
It is possible for the tripod attachment pin to remain in the engaged position even after the camcorder is removed. If this happens, once again hold the red button in and move the lever in the direction of the arrow, until the pin returns to its stowed position. If the pin remains in the engaged position it will not be possible to mount the camera.



Returning the tripod attachment pin to its stowed position

Adjusting the Shoulder Pad Position

The position of the shoulder pad is adjustable by 10 mm (0.4 inches) forward or back from the central position (factory shipped position). Use this adjustment to get the best balance for shooting with the camcorder on your shoulder.



Adjusting the shoulder pad position

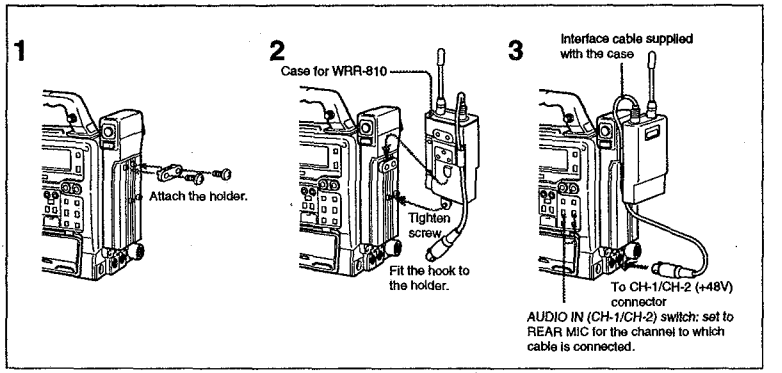
1 Loosen the two screws.

2 Slide the shoulder pad to the front or the rear, until it is in the most convenient position.

3 Tighten the screws.

Connecting a Wireless Microphone System

Using separately available components such as the WRT-810A/830A wireless microphone and WRR-810 UHF portable tuner, you can use a Sony wireless microphone system as an audio input source.
To connect a WRR-810 to this unit, use the special case attached to the back of the camcorder, as shown in the following figure.

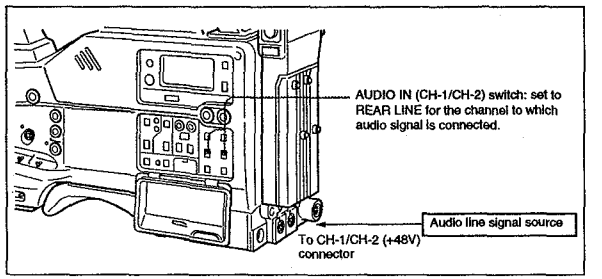


Connecting a wireless microphone system

For details of operation of the wireless microphone system, refer to the operating instructions supplied with the wireless microphone system.

Connecting Audio Line Signals

Connect an external audio line signal from a stereo amplifier or other equipment as shown in the following figure.

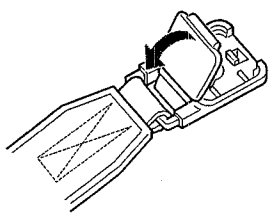


Connecting audio line signals

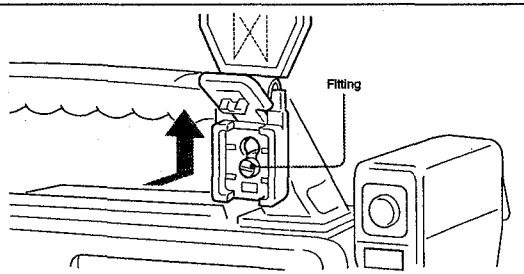
Fitting the Shoulder Strap

To use the shoulder strap for carrying the camcorder, use the following procedure to fasten it to the fitting points.

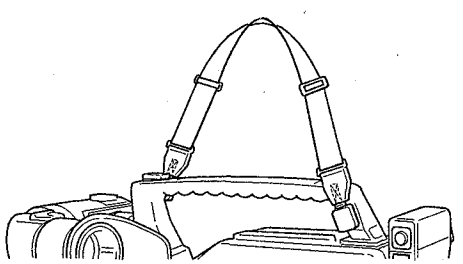
1 Open the cover of the fastener on one end of the shoulder strap.



2 Hook the fastener over the camcorder fitting and close the cover.



3 Attach the other end of the strap in the same way.



Removing the shoulder strap
Reverse the above procedure to remove the shoulder strap.

Connecting a Remote Control Unit

By connecting an optional RM-81 remote control unit to the REMOTE connector, you can start and stop recording by remote control.

Notes

- Always turn off the power switch on the camcorder before connecting or disconnecting the remote control unit.
- Be careful not to confuse the REMOTE connector with the EAR connector on the right side of the unit.

For details of operation, refer to the operation manual for the RM-81 remote control unit.

Power Sources

This unit can operate from either a battery pack or an AC power supply.

Anton Bauer Magnum Battery System and Superlight System
Equipping the unit with a special battery mount developed by Anton Bauer Corporation enables you to use the Anton Bauer Magnum battery and the Anton Bauer Superlight System.

For details, contact a dealer of Anton Bauer products.

Using the NP-1B Battery Pack

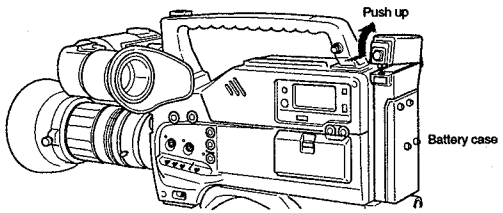
Before use, always charge the battery pack with a BC-1WD battery charger.

Notes on using a battery pack

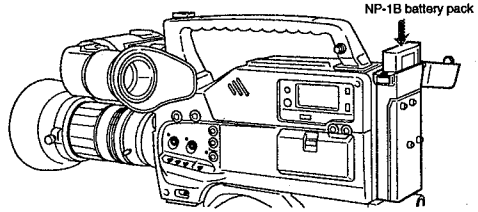
- Do not allow metal objects to come into contact with the metal parts of the battery pack. There is a danger of a short circuit.
- When not using the unit for a considerable period, remove the battery pack.
- Immediately after use the battery pack is somewhat warm. It may not be possible to charge it fully while it is still warm.

Power Sources

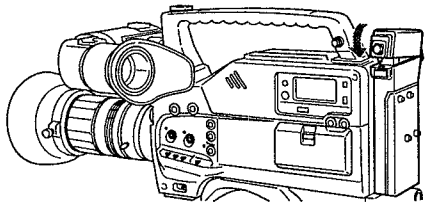
1 Open the cover of the battery case.



2 Insert a fully-charged battery pack.



3 Close the cover of the battery case.



Battery pack operating time

The unit will operate for about 60 minutes of continuous recording using a fully-charged NP-1B battery pack at normal temperatures. Very low temperatures may reduce the operation time.

Battery capacity indication

When the battery pack is almost exhausted, the indication "LOW BATT." appears in the viewfinder. At this point, replace with another fully-charged battery pack. If you continue to operate the unit without replacing the battery pack, the BATT indicator in the viewfinder also lights, and the "BATT.END" indication appears on the viewfinder screen.

Note on battery pack replacement

Always power off the unit before replacing the battery pack.

Checking the battery level

When the POWER switch is on, the BATT indication in the display window shows the battery level. If the battery pack is fully charged, there are six marks visible between "E" and "F".

BATT E[■■■■■■]F

Checking the battery level with the BATT indication

Using two NP-1B battery packs simultaneously

Use a DC-520 battery adaptor. In this case the continuous operating time is about 120 minutes.

For more details, refer to the operation manual for the DC-520.

Note

When using two NP-1B battery packs simultaneously, always replace the two battery packs at the same time. If you replace one only, the newly replaced battery pack may be subjected to an excessive load, resulting in the internal circuit breaker tripping.

Using the BP-90A Battery Pack

Using an optional DC-500 battery case, you can operate the unit from a BP-90A battery pack.
Again, by using the battery pack as an internal power source, and an external battery (for example a BP-90A in a DC-210 battery adaptor) connected to the DC IN connector, you can use both battery packs together.

For more details, refer to the operation manual for the DC-500.

BP-90A battery pack operating time
This unit will operate (continuous recording) for about 150 minutes with a fully-charged BP-90A battery pack.

Using the BP-L60/L90 Battery Pack

Using an optional BKW-L601 Battery Adaptor, you can operate the unit from a BP-L60/L90 Battery Pack.

For more details, refer to the operation manual supplied with the BKW-L601.

Using an AC Power Supply

You can use either a CMA-8A/8ACE camera adaptor or an AC-550/550CE AC adaptor (both supplied separately).

Notes

- When a power supply is connected to the DC IN connector, the unit always switches from the internal battery pack to use the external power source.
- When a power supply is connected to the DC IN connector, remove the internal battery pack if it is exhausted. If you connect a camera adaptor with an exhausted battery pack still in place, the camcorder may not operate when you turn the POWER switch on. In this case, turn the POWER switch off momentarily, then on again.
- There may be some noise on the video signal at the instant the power supply is switched.

Viewfinder Adjustments

The following adjustments are provided to make the viewfinder image easier to see.

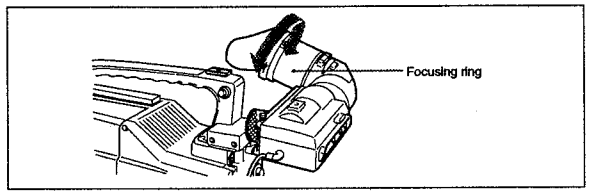
- Eyepiece focusing
- Contrast and brightness adjustments
- Edge enhancement of the viewfinder image

Note

You can use these adjustments to make the viewfinder image easier to work with. They do not affect the output video.

Adjusting the eyepiece focus

Turn the focusing ring until the viewfinder image is sharpest for your eyesight.



Adjusting the focus

The adjustable range of the eyepiece focus is from 0 to –3 diopters[1].
It is possible to change the adjustable range to –2 to +1 diopters or –0.5 to +3 diopters.

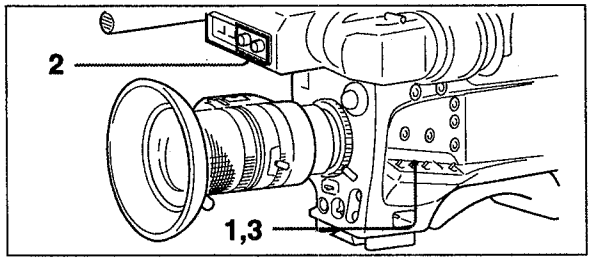
For more information about changing the eyepiece focus adjustable range, consult your Sony service representative.

1) **Diopter:** a unit of measurement of the refractive power of a lens.

Adjusting the viewfinder screen

Contrast and brightness adjustments

Use the color bar output to adjust the brightness and contrast of the viewfinder screen.



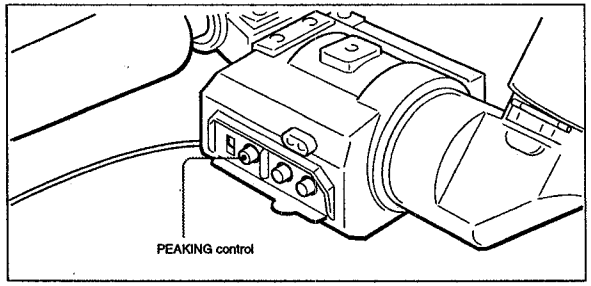
Adjusting the contrast and brightness

1 Set the OUTPUT switch to BARS.

2 While watching the image in the viewfinder, turn the CONTRAST control and BRIGHT control to adjust the contrast and brightness respectively.

3 Return the OUTPUT switch to CAM.

Outline emphasis adjustment

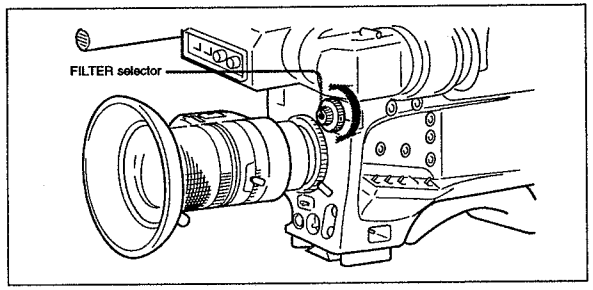


Outline emphasis adjustment

Turning the PEAKING control changes the degree of outline emphasis in the viewfinder image, to make focusing easier.

Color Temperature Filter Selection

The color temperature depends on the light source illuminating the subject. To get the correct lighting cast in the video, select the color temperature filter according to the lighting conditions.



Selecting the color temperature filter setting

FILTER selector settings

FILTER selector position	Color temperature and ND[a] filter	Lighting conditions
1	3200 K	Sunrise, sunset, studio lighting (with halogen lamps)
2	5600 K + 1/16 ND	Sunlight, and very bright conditions (snow and beach scenes)
3	5600 K	Cloudy or rainy conditions

a) ND filter: neutral density filter. A filter which does not change the color temperature.

When the filter is not correct for the lighting conditions

If the filter is not correct for the lighting conditions, the indication "LOW LIGHT" will appear on the viewfinder screen.

For details of the viewfinder warnings, see the section "Normal viewfinder display indications" (page 4-10).

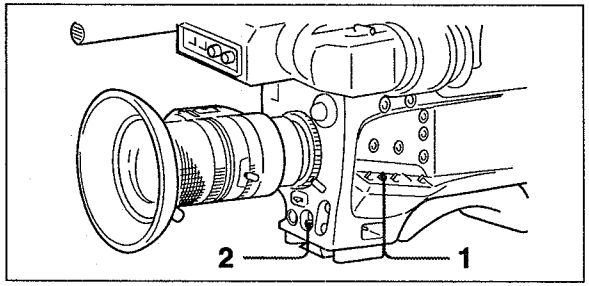
When a neutral density filter is required

When lighting conditions are so bright that they exceed the iris range, typically in bright sunlit beach and snow scenes, select FILTER setting 2, and then add a commercially available neutral density filter on the front of the camera. This will enable normal shooting.
Alternatively, you can use the AE function *(see page 5-8)*. This may, however, give unnatural results when shooting a fast-moving subject.

Black Balance Adjustment

Adjust the black balance to obtain correct color rendering of dark image areas. Adjusting the black balance also simultaneously adjusts the black set, and the adjustment values are stored in memory. Even when the unit is powered off and on, and when lighting conditions change, it is not normally necessary to adjust the black balance. It is, however, necessary in the following cases.

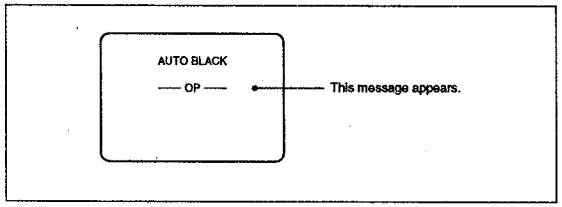
- If the message "MEMORY NG" appears in the viewfinder.
- When using the camcorder after a long time interval.
- If there is an extreme change in ambient temperature.



Black Balance Adjustment

1 Set the OUTPUT switch to CAM.

2 Push the white balance / black balance automatic adjustment switch to the BLK side.
The switch automatically returns to the center position when you take your finger away, and the iris automatically closes. During the adjustment the following viewfinder display appears.



Viewfinder display during black balance adjustment

The black balance adjustment takes a few seconds, then the viewfinder indication changes from "AUTO BLACK –OP–" to "AUTO BLACK –OK–". The adjustment settings are automatically stored in memory.

Note

The camera automatically shuts off the light during this adjustment, so if the iris adjustment is set to manual, you will need to open the iris manually after the adjustment is completed.

If the black balance adjustment is not possible

One of the indications shown in the following table appears in the viewfinder. Take the appropriate action, then repeat the adjustment.

Indications when the black balance adjustment is not possible

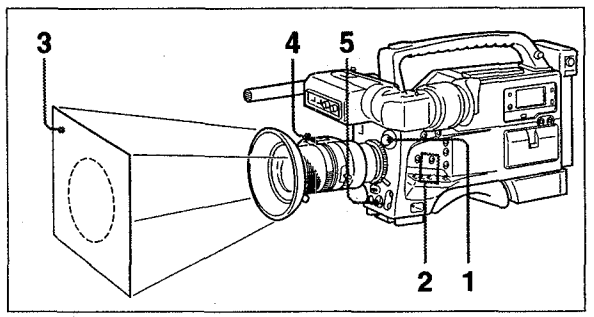
Indication	Problem
AUTO BLACK –NG– :IRIS NOT CLOSED TRY AGAIN	The iris did not close. Check that the lens cable is firmly connected and that there is no fault with the lens. If a retry still does not succeed, contact your local Sony service representative.
AUTO BLACK –NG– ?? TRY AGAIN	The iris opened during the adjustment, or there is a hardware error. If there appears to be a hardware error, contact your local Sony service representative.
BARS	The camera is outputting the color bar signal. Set the OUTPUT switch to CAM and repeat the operation.

White Balance Adjustment

Adjust the white balance according to the lighting conditions, to obtain correct color rendering.

The white balance adjustment values are stored in memory: two different settings can be stored, and are identified as A and B. These values are preserved when the unit is powered off.
Setting the W.BAL switch to A or B recalls the corresponding setting from memory. Thus it is possible to keep two settings immediately available for different lighting condition.

Use the following procedure to adjust the white balance.

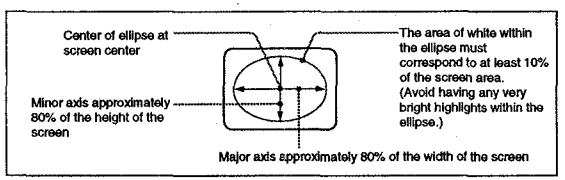


Adjusting the white balance

1 Select the FILTER setting to correspond to the illumination.

2 Set the OUTPUT, W.BAL, and ATW switches as follows.
OUTPUT: CAM
W.BAL: A or B
ATW: OFF

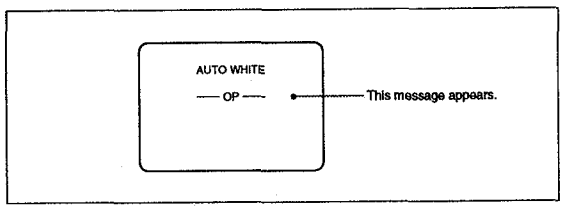
3 Place a white test card or cloth in the same lighting conditions as the subject to be shot, and zoom up so that the entire screen is white.
The minimum white area required for the adjustment is shown in the following diagram.



Minimum white area required for adjustment

4 Switch the zoom lens iris selector to A (AUTO).

5 Push the white balance / black balance automatic adjustment switch to WHT.
During the adjustment the following viewfinder display appears.



Viewfinder display during white balance adjustment

The white balance adjustment takes a few seconds, then the viewfinder indication changes from "AUTO WHITE –OP–" to "AUTO WHITE –OK–". The adjustment setting is automatically stored in memory A or B as selected in step **2**. These settings are preserved when the unit is powered off, and can be retained for up to approximately ten years.

If you wish to make a second white balance adjustment under different lighting conditions, repeat the process for the other memory.

If the white balance adjustment is not possible

One of the indications shown in the following table appears in the viewfinder. Take the appropriate action, then repeat the adjustment.

Indications when the white balance adjustment is not possible

Indication	Problem
AUTO WHITE –NG– :LOW LIGHT TRY AGAIN	The video level is too low. Increase the lighting level, or increase the video level by using the GAIN switch.
AUTO WHITE –NG– : ? ? TRY AGAIN	The image is not white. Point the camera at a white subject.
AUTO WHITE –NG– :C.TEMP.LOW CHG.FILTER TRY AGAIN	The color temperature is too low. Change the FILTER selector setting appropriately.
AUTO WHITE –NG– :C.TEMP.HI CHG.FILTER TRY AGAIN	The color temperature is too high. Change the FILTER selector setting appropriately.
:WHITE PRESET	The W.BAL switch is in the PRE position. Set the W.BAL switch to A or B.
BARS	The camera is outputting the color bar signal. Set the OUTPUT switch to CAM and repeat the operation.
AUTO WHITE –NG– :HIGH LIGHT TRY AGAIN	The white image in the camera field of view includes highlights. Substitute a subject of even intensity.

When there is no time for the adjustment

For hurried shooting, when there is no time for white balance adjustment, there are two techniques you can use.

- Using the ATW (Automatic Tracing White balance) function
- Using the preset values (for 3200 K and 5600 K)

Using the ATW function

When the ATW function is enabled, the unit automatically adjusts the white balance to follow any changes in lighting conditions during shooting.
To enable the ATW function, press the ATW button.

Disabling the ATW function

Press the ATW button once more.

If the ATW function cannot operate successfully

If the color temperature filter selected is not appropriate, and the adjustment range of the ATW function is exceeded, the ATW function provides the best setting possible, and displays a message in the viewfinder as shown in the following table. Take the appropriate action to correct the color temperature setting.

Indication	Problem
C.TEMP LOW	The color temperature is too low. Change the FILTER selector setting appropriately.
C.TEMP HI	The color temperature is too high. Change the FILTER selector setting appropriately.

Note

To ensure that the white balance is always correctly adjusted, it is recommended to carry out the adjustment by pressing the white balance / black balance automatic adjustment switch whenever the lighting conditions change.

Using the preset values

This unit has two preset values for white balance.
To use these preset values, check that the ATW function is disabled, and set the W. BAL switch to PRE. When the FILTER selector is in position 1, the white balance is adjusted to the preset value for 3200 K, and in other positions to the preset value for 5600 K.
This gives a generally adequate white balance, for instant shooting requirements.

Chapter 4
Basic Recording and Playback

This chapter describes basic procedures for shooting. It then describes indications which appear in the viewfinder and display window.

Cassettes

Cassettes Used in This Unit

This unit uses S-size 1/2-inch Betacam SP metal tape cassettes. The type numbers of these tapes, with their recording times, are shown in the following table.

Cassettes used in this unit

Type	Recording time (minutes)
BCT-5MA	5
BCT-10MA/UVWT-10MA	10
BCT-20MA/UVWT-20MA	20
BCT-30MA/UVWT-30MA	30

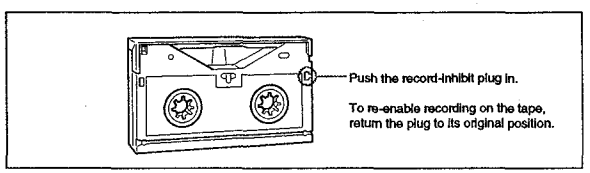
Note

If you insert an oxide tape such as a BCT-5G/10G/20G/30G tape, the unit ejects it automatically.

Notes on Using Cassettes

Preventing erasure

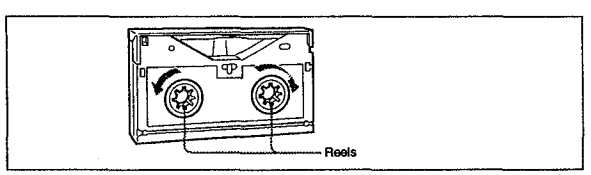
To protect recording on a tape, by preventing inadvertent erasure, do as follows.



Preventing erasure

Checking the tape for slack

Push in the reels with a finger and turn gently in the directions shown by arrows. If the reels will not move, there is no slack.



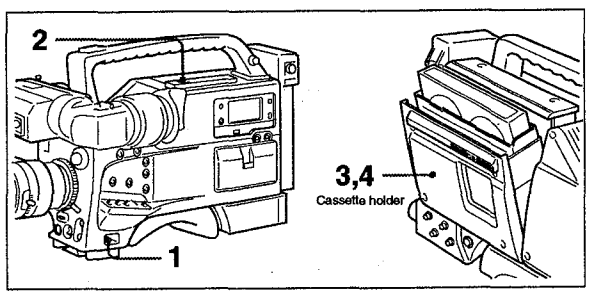
Checking the tape for slack

Inserting and Removing Cassettes

Note

When the cassette holder is open, the delicate internal mechanism, particularly the tape transport and drum, is exposed. Take care not to insert cassettes other than in the position illustrated below or to let any foreign bodies get in the tape compartment, as this can lead to damage to the mechanism.

Inserting a cassette



Inserting a cassette

1 Turn the POWER switch on.

2 Press the EJECT button to open the cassette holder.

You can press the EJECT button even when the cover is closed.

3 Check the points below, then insert the cassette with the window outward.
- The cassette must not have the record-inhibit plug pushed in.
- There must be no slack in the tape.

4 Close the cassette holder by pressing the point marked "PUSH" on the cassette holder.

Removing the cassette

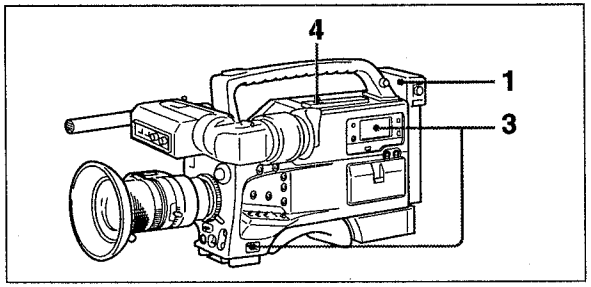
With the power supply on, press the EJECT button so that the cassette holder opens, then take out the cassette.
Then close the cassette holder. The panel at the top of the cassette holder then comes down.

Basic Operations

This section describes the basic operations for shooting. For best results, refer also to the various settings described in Chapter 5 "Adjustments."

Shooting/Recording

From powering on to loading a cassette



Powering on and loading a cassette

1 Load a fully charged battery pack.

2 Make the necessary connections to other equipment.

For details, see the section "Attaching Accessories" (page 3-5).

3 Turn the POWER switch on, and check that the HUMID indication has not appeared in the display window and that the BATT indication is not flashing.
- If the HUMID indication is showing, wait until it disappears.
- If the BATT indication is flashing, replace the battery pack with a fully charged one.

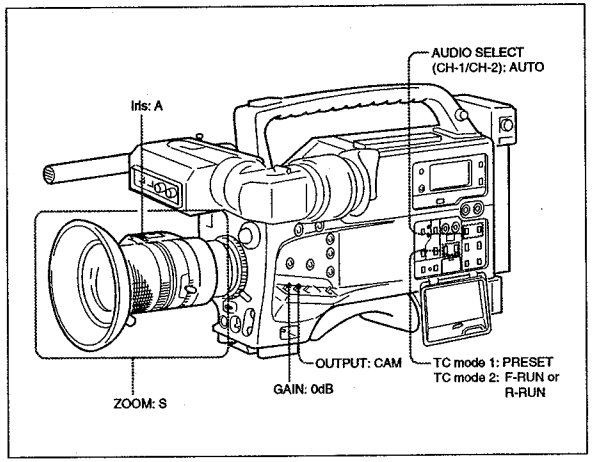
4 Press the EJECT button to open the cassette holder.

5 Load the cassette, after checking the points below, then close the cassette holder.
- The cassette is not set to inhibit recording.
- There is no slack in the tape.

From adjusting black balance and white balance to end of recording

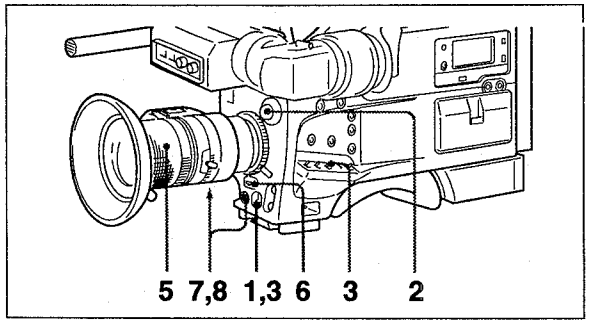
Switch settings

After turning the power supply on and loading a cassette, set the switches as below and begin operations.



Switch settings

Shooting



Shooting

1 Adjust the black balance.

For details, see the section "Black Balance Adjustment" (page 3-26).

2 Adjust the FILTER selector setting according to the lighting conditions.

For details, see the section "Color Temperature Filter Selection" (page 3-25).

3 Adjust the white balance.

For details, see the section "White Balance Adjustment" (page 3-27).

4 Aim the camera at the subject, ensuring that it is at least 1 meter away.

5 Turning the focusing ring to adjust the focus, check the focus in the viewfinder or on a monitor.

6 If necessary, select the appropriate shutter speed.

For details, see the section "Setting the Shutter Speed" (page 5-5).

7 Press the VTR button on the camera body or the lens, to start recording.

8 To pause recording, press the VTR button once more.
The REC indicator will go off, and the unit will be in the "standby on"[1] mode.
To stop recording completely[2] after pausing, press the STOP button.

1) **"Standby on":** This term means that the recorder is on standby, with the drum rotating and the tape held in tension by the pressure of the capstan and pinch rollers. In this state, recording starts within about 0.3 seconds of pressing the VTR button.

2) The state after the STOP button is pressed is also referred to as "standby off" mode. In this state, although the tape is wound round the drum, the drum is stationary and the capstan and pinch roller pressure is not applied. It takes about 3 seconds to start recording after the VTR button is pressed.

Notes

- During recording, the tape control buttons (EJECT, REW, F FWD, PLAY, STOP, REC REVIEW) have no effect.
- If you leave the unit in the paused state ("standby on") for eight minutes (you can change the period), then to protect the tape, the unit automatically releases the tape tension ("standby off" mode).

To change the maximum period that the unit will stay in the paused state, see the section "Using the VTR Menu" (page 5-21).

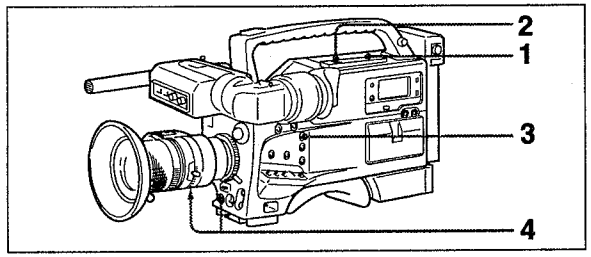
Recording Continuity

As long as the camera POWER switch is in the ON position, pressing the camera or lens VTR button repeatedly to start and stop recording results in a continuous recording on the tape. To make the time code recorded on the tape also continuous, set the TC mode switches 1 and 2 to PRESET and R-RUN respectively.
If, however, you do any of the following things during shooting, pressing the VTR button will not result in continuous recording.

- Eject the cassette
- Playback, fast forward, or rewind the tape
- Press the STOP button in the tape transport section.

Making a continuing recording on an already recorded tape

It is possible to record from an intermediate point on an already recorded tape. In this case, to make the time code also continuous, see the section "Making the time code continuous" (page 6-4).



1 Press the PLAY button, and watch the playback in the viewfinder.

2 At the point from which you wish to continue recording, press the STOP button.

3 Press the REC REVIEW button on the camera body.
This cues up the tape to the point at which you pressed the STOP button.

(Continued)

4 Press the camera or lens VTR button to begin recording.

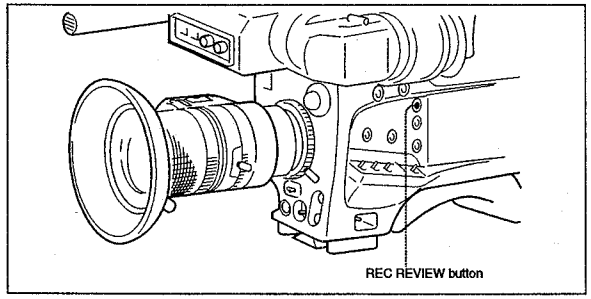
Notes

If you turn the POWER switch off during recording, or when recording is paused, the unit automatically goes through its shut-down sequence, then powers off. When you next turn the POWER switch on, the unit automatically finds the point at which recording ended, and sets itself up so that you can carry on with continuous recording. Note that this operation takes several seconds: do not turn the POWER switch off or replace the battery during this interval, as the automatic recording continuity will be lost.
Note also that the recording continuity is lost in the following cases:

- If the POWER switch is turned on and off repeatedly.
- If the unit is left powered off for several hours.
- If the unit is subject to severe vibration while powered off.
- If for any other reason the automatic recording continuity function is unable to operate correctly.
- If the lithium battery is exhausted, or if no lithium battery has been fitted.

Recording Review Function

The recording review function enables you to check the last few seconds of recording in the viewfinder.



Recording review function

With recording paused, press the REC REVIEW button on the camera body. Depending on how long you hold down the REC REVIEW button, the unit automatically rewinds the tape for between two and ten seconds before the pause, and plays back this section in the viewfinder, also outputting the sound to the earphone or speaker. After the playback, the unit returns to the paused state.

Note

If during recording review you press the VTR button or the trigger switch on an RM-81, the recording review function is abandoned, and recording starts. In this case it is not possible to make the recording continuous from the previous recording.

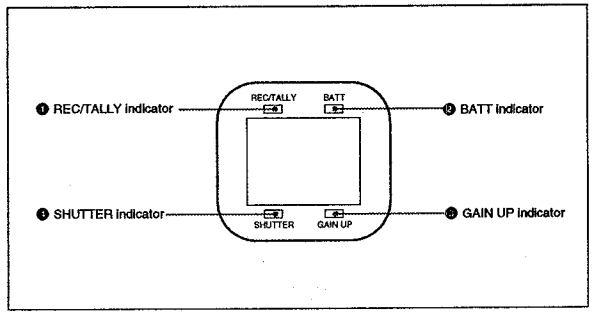
Indications in the Viewfinder and Display Window

This section describes the messages and indications that appear in the viewfinder or in the display window.

Indications in the Viewfinder

Point indicators in the viewfinder display

There are four point indicators in the viewfinder around the periphery of the screen. These flash or light continuously to indicate particular statuses of the unit.



Point indicators in the viewfinder display

❶ REC/TALLY indicator (red)
This lights when the built-in VTR or a VTR connected to the EXT VTR connector is recording. It flashes when there is a fault.

❷ BATT indicator (red)
This flashes when the battery pack in this unit or in a VTR connected to the EXT VTR connector is almost exhausted. It lights continuously immediately before the battery pack is completely exhausted.

❸ GAIN UP indicator (orange)
This lights when the GAIN switch is in the MID or HIGH position, or when the gain has been increased automatically by the AGC function.

❹ SHUTTER indicator (red)
This lights when the SHUTTER switch is in the ON position, or when the AE function has been enabled and the electronic shutter is operating.

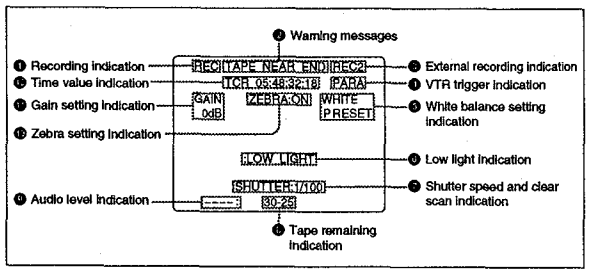
For details of the AE function, see the section "Automatic Exposure Function" (page 5-8).

Normal viewfinder display indications

The following indications appear in the viewfinder display.

Note

The viewfinder indications (other than menus) do not appear during playback, rewind, fast forward and recording review operation.



Normal viewfinder display indications

Selecting the display indications

You can use a menu operation to select whether or not and in some cases how to display some of the above indications, as shown in the following table.

Selecting the display indications

Display indication	Selection	See page
❺ Low light indication	Display or not display	5-19
❼ Shutter speed and clear scan indication	Display continuously or for two seconds	5-5
❽ Tape remaining indication	Display or not display	5-19
❾ Audio level indication	Display or not display, and which channel to display	5-15
⓯ Time value indication	Display or not display	5-19

Enabling and disabling display indications with the DOWN/OFF and UP/ON buttons

Regardless of the settings of the menu selections described above, it is possible to turn off some of the normal viewfinder indications by pressing the DOWN/OFF button. To restore the indications, press the UP/ON button.

This function applies to the following indications together; it is not possible using this method to turn individual indications on or off.

- ❶ Recording indication
- ❸ External recording indication
- ❽ Tape remaining indication
- ❾ Audio level indication
- ⓯ Time value indication

However, when an external VTR connected to the EXT VTR connector is powered on, it is not possible to disable ❶ recording indication and ❸ external recording indication.

Interpretation of the indications

The interpretation of the indications is as follows.

❶ Recording indication

This indicates that the built-in VTR is recording.

❷ Warning messages

The warning messages listed in the following table appear as appropriate.

Warning messages

Message	Meaning
NO TAPE	There is no cassette inserted.
REC INHIBIT	The cassette has the record-inhibit plug pushed in.
LOW BATT.	The battery is low.
BATT.END	The battery is exhausted.
TAPE NEAR END	The tape is near the end.
TAPE END	The tape is at the end.
CHECK REMOTE	A device other than a remote control unit (a headphone for example) appears to be connected to the REMOTE connector.
SERVO	Servo lock is lost.
HUMID	There is condensation on the drum.
RF	The video heads are clogged, or there is a fault in the recording system.
SLACK	The tape cannot be wound properly.
OXIDE TAPE	The cassette inserted is an oxide tape cassette. (The cassette is automatically ejected.)

❸ External recording indication

This indicates that the VTR connected to the EXT VTR connector is recording. It flashes if there is a fault on the external VTR.

❹ VTR trigger indication

When an external VTR is connected to the EXT VTR connector, when you change the setting of the VTR TRIGGER switch, the indication of the new setting appears for two seconds. This indication also appears when the unit is powered on (for five seconds) and while the DISP CHG switch is held up with the viewfinder in normal display mode.

VTR TRIGGER switch settings and VTR trigger indications

VTR TRIGGER switch setting	VTR trigger indication
PARALLEL	PARA
INT ONLY	INT
EXT ONLY	EXT

❺ White balance setting indication

The white balance setting indication appears in the following cases:

- When you use the W.BAL switch to carry out automatic white balance adjustment, and when you enable the ATW (Auto Tracing White balance) function with the ATW button (for about two seconds).
- When you power on the unit (for about five seconds).
- In the normal display, while the DISP CHG switch is held up.

The indication reflects the W.BAL switch and ATW button settings as shown in the following table.

W.BAL switch and ATW button settings and white balance indication

Settings	Indication
W.BAL switch in A position	WHITE AUTO/A
W.BAL switch in B position	WHITE AUTO/B
W.BAL switch in PRE position	WHITE PRESET
When ATW button is on and ATW function is operating	ATW ON

❻ Low light indication

When the lighting is inadequate, the "LOW LIGHT" indication appears. Depending on the conditions, make one of the following adjustments.

- Make the lighting brighter.
- Open the iris manually, or use the auto iris function.
- Select the correct filter.
- Increase the gain.

❼ Shutter speed and clear scan indication

This indicates the following.

- The shutter speed value
- The clear scan frequency setting

You can use a menu setting to select whether this indication should be displayed continuously or for two seconds only after powering on or changing the setting. In any event, it is always displayed in the normal display while the DISP CHG switch is held up.

For details of the shutter speed setting and clear scan function, see the section "Shutter Speed" (page 5-5).

❽ Tape remaining indication

This shows the amount of tape remaining as shown in the following table.

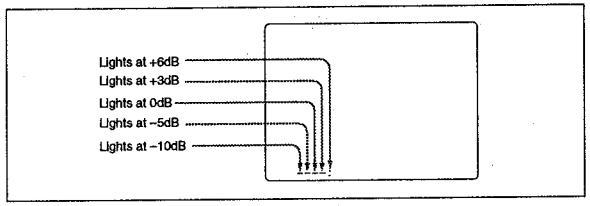
Tape remaining indication

Tape remaining	Tape remaining indication
35 to 30 minutes	35-30[a)]
30 to 25 minutes	30-25
25 to 20 minutes	25-20
20 to 15 minutes	20-15
15 to 10 minutes	15-10
10 to 5 minutes	10-5
5 to 0 minutes	5-0
2 to 0 minutes	5-0 (flashing)

a) UVW-100BPK/100BPL/100BPF only

❾ Audio level indication

This shows the audio level for the channel (1, or 2) selected in the menu.



Audio level indication

❿ Zebra setting indication

The indication of the setting of the ZEBRA button (ON or OFF) appears in the following cases:

- When you change the setting of the ZEBRA button (for about two seconds).
- When you power on the unit (for about five seconds).
- In the normal display, while the DISP CHG switch is held up.

⓫ Gain setting indication

The video gain setting indication appears in the following cases:

- When you use the GAIN switch is used to change the gain setting or when the AGC button is set to ON (for about two seconds).
- When you power on the unit (for about five seconds).
- In the normal display, while the DISP CHG switch is held up.

The indication reflects the GAIN switch and AGC button settings as shown in the following table.

GAIN switch and AGC button settings and gain setting indication

Settings	Indication
GAIN switch in 0dB position	GAIN 0dB
GAIN switch in MID position	GAIN xdB (where x is MID setting; default 9 dB)
GAIN switch in HIGH position	GAIN xdB (where x is HIGH setting; default 18 dB)
When AGC button is on and AGC function is operating	AGC ON LIMIT z dB (where z is upper limit to gain)

For details of the gain settings, see the section "Video Gain Adjustment" (page 5-3).

⑫ Time value indication

This shows the value for the built-in VTR, selected by the DISPLAY switch as shown in the following table.

DISPLAY switch setting and time value displayed

DISPLAY switch setting	Time value displayed
CTL	CTL: tape running time calculated by counting pulses of the CTL (control) signal
TC	TC: time code value from the time code generator
U-BIT	U-BIT: user bit value from the user bit generator

Note

During black balance and white balance adjustment or during playback, fast forward, rewinding and recording review the time value is not shown.

Viewfinder menu display

It is possible to display some of the settings of the unit which do not appear on the normal viewfinder display in a series of menu screens.

For details of the settings you can change, see the page numbers listed in the table on page 4-16.

Displaying the menu screens

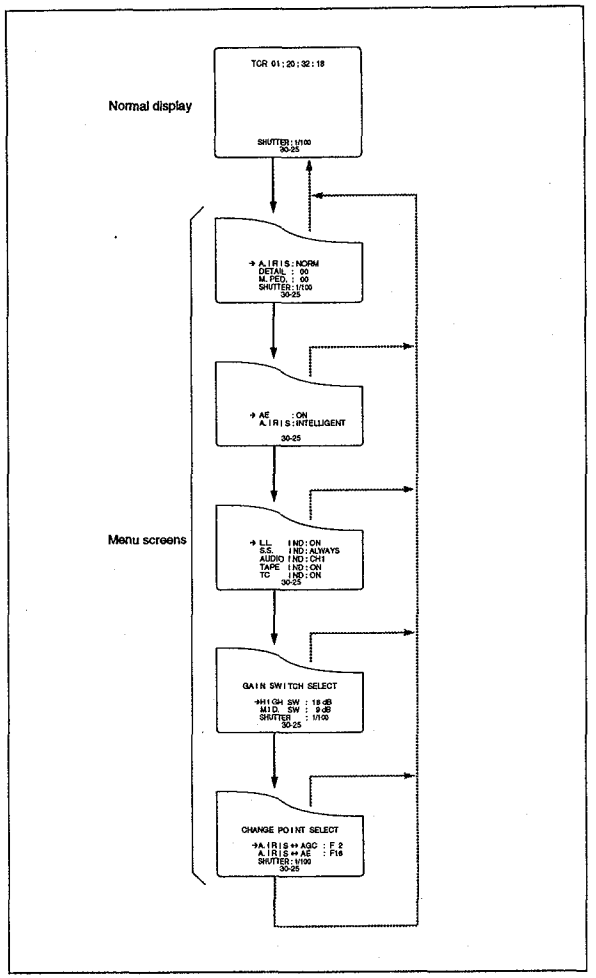
When the normal display is present, press the DISP CHG switch down.
This displays the first of the total of five menu screens.

Displaying the next menu screen

Press the DISP CHG switch down repeatedly until the cursor is on the lowest item, then press the DISP CHG switch once more.
This switches to the next menu screen.

Returning from the menu screens to the normal display

On the menu screen, press the DISP CHG switch up repeatedly until the cursor is on the top item, then press the DISP CHG switch once more.
This returns from the menu screens to the normal display



Transition diagram for the normal display and menu screens

Indications in the Viewfinder and Display Window

Items shown on the menu screens

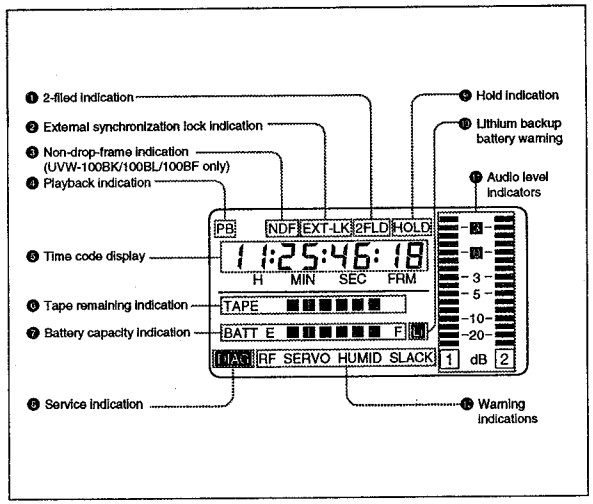
The items shown on the menu screens and their meanings are shown in the following table.

Items shown on the menu screens

Indication	Meaning	Settings	See page
A. IRIS	Reference value for auto iris	–1.0, –0.5, NORM, 0.5, or 1.0	5-2
DETAIL	Detail level	–99 to +99	5-14
M. PED	Master pedestal level	–99 to +99	5-13
SHUTTER (CLS)	Shutter speed or clear scan frequency	Shutter speed: 1/60 (UVW-100BPK/100BPL/100BPF), 1/100 (UVW-100BK/100BL/ 100BF), 1/250, 1/500, 1/1000, or 1/2000 Clear scan frequency: 59.9 to 200.3 Hz (UVW-100BK/100BL/ 100BF)/50.0 Hz to 201.5 Hz (UVW-100BPK/100BPL/100BPF)	5-5
AE	Automatic exposure function	ON or OFF	5-8
A. IRIS	Intelligent auto iris function (backlight correction)	INTELLIGENT or NORMAL	5-12
L. L. IND	Low light indication	ON or OFF	5-19
S. S. IND	Shutter speed indication	ALWAYS or 2 SEC	5-6
AUDIO IND	Audio level indication and channel selection	OFF, CH-1 or CH-2	5-15
TAPE IND	Tape remaining indication	ON or OFF	5-19
TC IND	Time code indication	ON or OFF	5-19
HIGH SW	GAIN selector HIGH setting	2dB to 18dB	5-3
MID. SW	GAIN selector MID setting	1dB to 17dB	5-3
A. IRIS ↔ AGC	Aperture for switching between AGC and auto iris.	F1.4, F2, F2.8, or F5.6	5-9
A. IRIS ↔ AE	Aperture for switching between AE function and auto iris.	F16, F11, F8, F5.6 or F4	5-10

Indications in the Display Window

The following indications appear in the display window.



Indications in the Display Window

❶ 2-field indication

This appears when the internal time code generator has color frame locking disabled.

❷ External synchronization lock indication

This appears when the internal time code generator is locked to an external signal input to the TC IN connector.

❸ Non-drop-frame indication (for UVW-100BK/100BL/100BF only)

This appears when non-drop-frame mode is selected.

❹ Playback indication

This appears during playback with the time code display showing a time code or user-bit value.

❺ Time code display

Depending on the setting of the DISPLAY switch, this shows a counter value, time code value or user-bit value.

For details, see the section "Normal viewfinder display indications" (page 4-10).

❻ Tape remaining indication

This shows the remaining tape time during recording or a pause in recording, as shown in the following table.

Tape remaining indication

Indication	Tape time remaining
TAPE ■■■■	25 minutes or more
TAPE ■■■■	20 to 25 minutes
TAPE ■■■■	15 to 20 minutes
TAPE ■■■	10 to 15 minutes
TAPE ■■	5 to 10 minutes
TAPE ■	2 to 5 minutes
TAPE ■ (flashing)	0 to 2 minutes
TAPE (flashing)	End of tape
No indication	No cassette loaded

❼ Battery capacity indication

This shows the battery capacity as shown in the following table.

Battery capacity indication

Indication	Battery voltage
BATT E ■■■■ F	12.5 V or more
BATT E ■■■■ F	12.0 V to 12.5 V
BATT E ■■■■ F	11.75 V to 12.0 V
BATT E ■■■ F	11.5 V to 11.75 V
BATT E ■■ F	11.3 V to 11.5 V
BATT E ■■ F (flashing) a)	11.25 V to 11.3 V
BATT E ■ F (flashing)	11.0 V to 11.25 V
BATT E F (flashing)	11.0 V or less

a) Replace the battery pack when this indication appears.

❽ Service indication

This appears during maintenance and special setting operations. It does not appear during normal operation.

❾ Hold indication

This appears when the internal time code generator is stopped.

❿ Lithium backup battery warning

This appears when the voltage of the internal lithium backup battery is low. If this indication appears, replace the lithium backup battery immediately.

For how to replace the lithium backup battery, see the section "Replacing the Lithium Battery" (page 5-20).

⓫ Audio level indicators

These show the audio recording or playback levels. There are two indications, for channels 1 and 2 respectively.
When using the AUDIO LEVEL (CH-1/CH-2) knobs to adjust the audio levels manually, adjust so that the the indications are 0 dB at the maximum sound level.

⓬ Warning indications

These comprise the following indications.
RF: The video heads are clogged, or there is a fault in the recording system.
SERVO: Servo lock is lost.
HUMID: There is condensation on the drum.
SLACK: The tape cannot be wound properly.

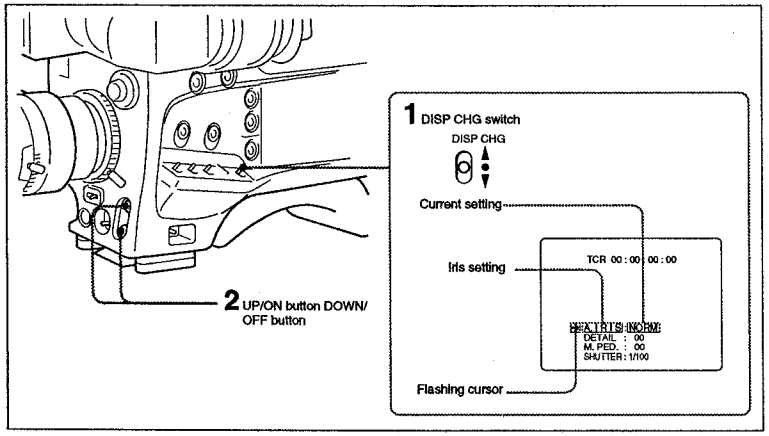
Chapter 5
Adjustments

This chapter describes various adjustments and settings which are necessary for high quality recording.

Changing the Reference Value for Automatic Iris Adjustment

When you wish to obtain special effects, such as a lighter effect when shooting against backlighting, you can change the reference value for automatic iris adjustment. From the standard value, you can make any of the following adjustments. The setting is preserved when the unit is powered off.

- –1.0 (iris closed by about one f-stop)
- –0.5 (iris closed by about half an f-stop)
- NORM (standard reference position)
- 0.5 (iris opened by about half an f-stop)
- 1.0 (iris opened by about one f-stop)



Changing the reference value for automatic iris adjustment

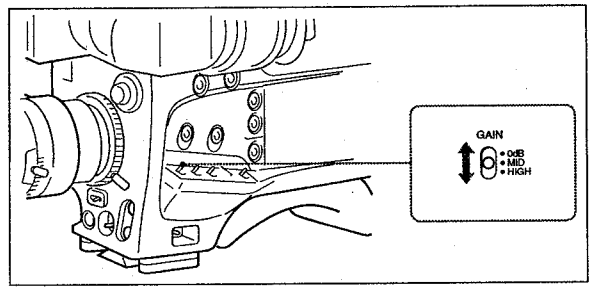
1 Press the DISP CHG switch down repeatedly until the menu screen shown in the figure appears on the viewfinder screen.

2 Set the value as shown in the following table.

Setting change	Operation
To increase the setting	Press the UP/ON button.
To decrease the setting	Press the DOWN/OFF button.
To return to the standard setting	Press the UP/ON button and DOWN/OFF button simultaneously.

Video Gain Adjustment

When the lighting conditions are poor, and the video image is too dark, it is possible to increase the video gain by changing the setting of the GAIN switch.



GAIN switch

The GAIN switch changes the video gain setting as follows.
0dB: normal gain
MID: setting for MID gain position (default 9 dB)
HIGH: setting for HIGH gain position (default 18 dB)

For details of how to set the MID and HIGH values, see the next section "Gain settings".

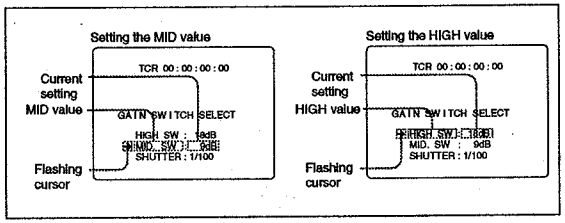
Gain settings

You can set both the MID and HIGH gain settings to values from 0 dB to 18 dB in 1 dB steps.

Note

It is not possible to set the MID value to more than the HIGH value.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



(Continued)

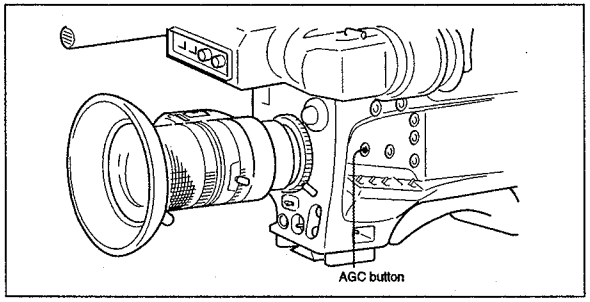
Video Gain Adjustment

2 Set the value as shown in the following table.

Setting change	Operation
To increase the setting	Press the UP/ON button.
To decrease the setting	Press the DOWN/OFF button.
To return to the default setting (MID: 9 dB, HIGH: 18 dB)	Press the UP/ON button and DOWN/OFF button simultaneously.

Automatic Gain Control

Using the Automatic Gain Control (AGC) function, you can have the unit automatically adjust the gain when lighting conditions are poor. Unlike manual gain adjustment, this provides a continuous adjustment, and therefore provides a more natural effect as lighting conditions change.



To use AGC function

To use the AGC function, press the AGC button, turning the AGC indicator on. The range over which the AGC function adjusts the range is determined by the setting of the GAIN switch as shown in the following table.

Gain adjustment range

GAIN switch setting	Automatic gain adjustment range
0dB	0 dB
MID	From 0 dB to the MID setting (default 9 dB)
HIGH	From 0 dB to the HIGH setting (default 18 dB)

When you are using the AGC function and the gain has been raised, the viewfinder GAIN UP indicator lights.
To switch the AGC function off, press the AGC button again.

Notes

- When the gain is raised, the picture quality is slightly degraded.
- To shoot a dark location so that it appears dark, do not use the AGC function.

Shutter Speed

This section describes the following operations:

- How to set the shutter speed
- How to use the clear scan function to reduce dark bands when shooting a computer screen
- Automatic exposure control in over-bright lighting conditions

Setting the Shutter Speed

You can select the shutter speed from five values, according to the lighting conditions.
NTSC: 1/100 (factory default), 1/250, 1/500, 1/1000, 1/2000 seconds
PAL: 1/60 (factory default), 1/250, 1/500, 1/1000, 1/2000 seconds
The setting is saved in memory and preserved when the unit is powered off.

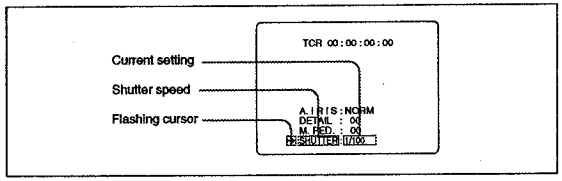
Notes on setting the shutter speed

- To avoid flicker when shooting under fluorescent or mercury discharge lighting, set the shutter speed to 1/100 (or 1/60) second.
- When the AE function is enabled, it is not possible to select the shutter speed. Turn the AE function off before setting the shutter speed.

  For details of the AE function, see the section "Automatic Exposure Function" (page 5-8).

- If you use faster shutter speeds under fluorescent or mercury discharge lighting, as the shutter speed becomes faster there will be an increase of flicker and color distortion. In these cases, set the shutter speed to 1/100 (or 1/60) second.
- When using faster shutter speeds, the smear phenomenon may become more pronounced.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



2 Set the SHUTTER switch to ON.
The shutter speed indication in the viewfinder display changes from "OFF" to the current setting.

(Continued)

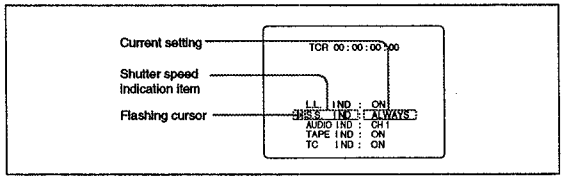
3 Use the UP/ON and DOWN/OFF buttons to set the shutter speed.

Setting change	Operation
To increase the setting	Press the UP/ON button.
To decrease the setting	Press the DOWN/OFF button.
To return to the default setting (1/100 (NTSC) or 1/60 (PAL))	Press the UP/ON button and DOWN/OFF button simultaneously.

Selecting the shutter speed display time

You can select whether to have the shutter speed displayed constantly in the viewfinder, or only when you change the setting.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



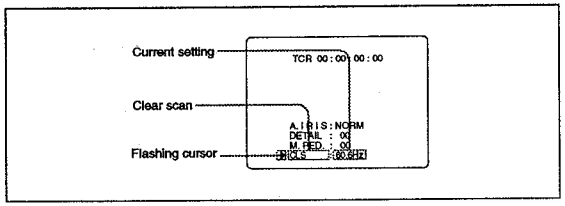
2 Use the UP/ON and DOWN/OFF buttons to select the shutter speed indication.

Selection required	Operation
Constant display	Set to "ALWAYS".
Display for 2 seconds only after change or power on	Set to "2 <SEC>".

Clear Scan Function

When shooting a computer monitor screen (or projection image), you can use the clear scan function to reduce the moving dark bands which otherwise appear across the screen.
You can set the frequency for the clear scan function to any frequency in the following range, to correspond to the scan frequency of the monitor:
NTSC: 59.9 Hz to 200.3 Hz.
PAL: 50.0 Hz to 201.5 Hz
The setting is saved in memory and preserved when the unit is powered off.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



If instead of the clear scan setting (CLS: xx.xHz) there is a shutter speed indication (SHUTTER: 1/xxx), press the UP/ON button repeatedly until the clear scan setting appears.

2 Use the UP/ON and DOWN/OFF buttons to set the clear scan frequency.

Setting change	Operation
To increase the frequency	Press the UP/ON button.
To decrease the frequency	Press the DOWN/OFF button.
To return to the default shutter speed setting (1/100 (NTSC) or 1/60 (PAL))	Press the UP/ON button and DOWN/OFF button simultaneously.

Note on scan frequency values

The vertical scan frequency will depend on the type of computer, and also the type of monitor or software running. It may not always be possible to eliminate all of the banding effect.

Example vertical scan frequencies

- IBM PC/AT or compatibles
  VGA, 640 × 480 resolution: 60 Hz or 72 Hz
  S-VGA, 800 × 600 resolution: 72 Hz
  S-VGA or XGA, 1024 × 768 resolution: 70 Hz
  S-VGA, 1280 × 1024 resolution: 60 Hz or 74 Hz
- Macintosh
  13" mode, 640 × 480 resolution: 67 Hz
  16" mode, 832 × 624 resolution, 19" mode, 1024 × 768 resolution, 21" mode, 1152 × 870 resolution: 75 Hz

1) Macintosh is a registered trademark of Apple Computer Corporation.

2) IBM and AT are registered trademarks of International Business Machines, Inc.

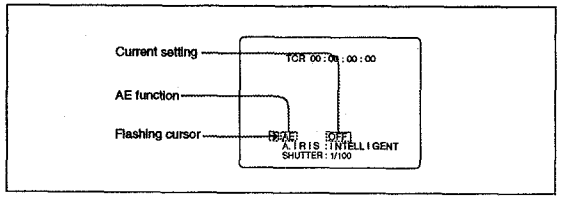
Automatic Exposure Function

The automatic exposure (AE) function uses the electronic shutter of the CCD imager to adjust the exposure automatically when the lighting conditions are too bright. Using this function the shutter speed can be set to any value from 1/60 second (NTSC) or 1/50 second (PAL) to 1/250 second, in steps of approximately 1/15000 second.
When the AE function is operating the electronic shutter, the SHUTTER indicator in the viewfinder lights.

Note on the AE function

The AE function is recommended for use in natural lighting conditions. Under fluorescent or mercury discharge lighting, it may lead to flicker.

1 Press the DISP CHG switch down repeatedly until the menu screen shown in the figure appears on the viewfinder screen.



2 Press the UP/ON button to enable the AE function.

Disabling the AE function
To turn the AE function off, press the DOWN/OFF button.

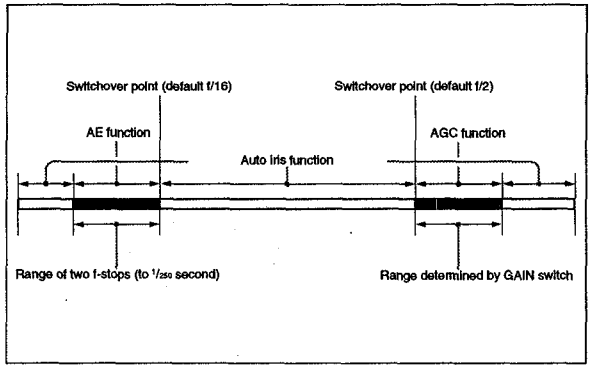
Automatic Exposure Control Using the AGC and AE Functions

With a conventional video camera, in addition to adjusting the iris, it is normally possible to increase the video gain or add neutral density filters according to the lighting conditions. In addition to these functions, this unit allows you to use the following automatic adjustments.
- The AGC function when the lighting level is too low
- The AE function when the lighting level is too high

By combining the AGC and AE functions, you can obtain even easier shooting conditions.
This section describes the settings for combining the AGC and AE functions.

Using the Auto Iris Function

When using the auto iris function together with the AGC and AE functions, you can effectively add the adjustment ranges of the three functions, as shown in the following figure.



Automatic exposure control using the AGC and AE functions

It is possible to change the f-stops at which the switchovers to the AGC and AE functions occur.

For details, see the section "Setting the f-stop to switch between auto iris and the AGC function" below and "Setting the f-stop to switch between auto iris and the AE function" (page 5-10).

Setting the f-stop to switch between auto iris and the AGC function

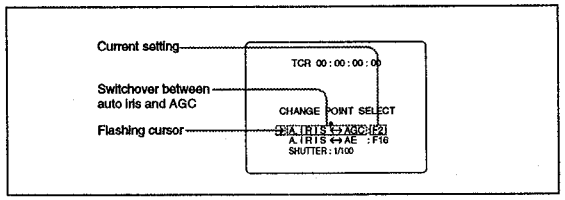
Select the f-stop from the following five values: f/1.4, f/2, f/2.8, f/4 and f/5.6.

Note

If you set the switchover point to f/1.4, and use the motorized zoom to zoom completely to telephoto, colored effects may appear at the top and bottom edges of the picture.

Automatic Exposure Control Using the AGC and AE Functions

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



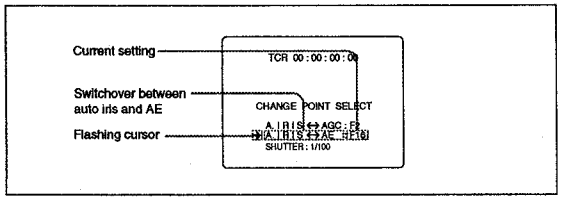
2 Use the UP/ON and DOWN/OFF buttons to change the f-stop.

Setting change	Operation
To increase the f-stop	Press the UP/ON button.
To decrease the f-stop	Press the DOWN/OFF button.
To return to the default setting (f/2)	Press the UP/ON button and DOWN/OFF button simultaneously.

Setting the f-stop to switch between auto iris and the AE function

Select the f-stop from the following five values: f/16, f/11, f/8, f/5.6 and f/4.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.

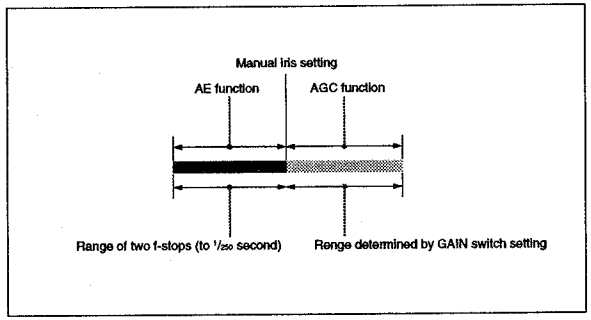


2 Use the UP/ON and DOWN/OFF buttons to change the f-stop.

Setting change	Operation
To increase the f-stop	Press the UP/ON button.
To decrease the f-stop	Press the DOWN/OFF button.
To return to the default setting (f/16)	Press the UP/ON button and DOWN/OFF button simultaneously.

Using the Manual Iris Adjustment

When using manual iris adjustment together with the AGC and AE functions, the exposure adjustment is carried out as shown in the following figure.



Manual exposure control using the AGC and AE functions

Depth of field

The depth of field is the distance in front and behind a subject for which the image is still in focus.

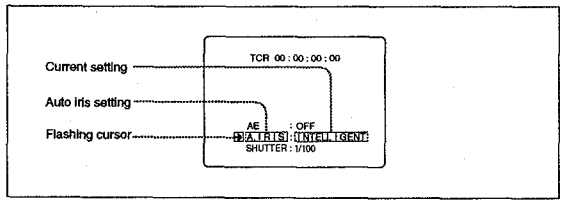
Iris adjustment and depth of field
Closing the iris progressively increases the depth of field. Equally, opening the iris decreases the depth of field, and you can use this to accentuate foreground objects by making the background out of focus.

Depth of field and the AGC and AE functions
The iris controls the aperture of the lens, and thus the amount of light admitted, and at the same time affects the depth of field. With a conventional camera, changing the depth of field inevitably changes the overall exposure, but now using the AGC and AE functions, you can simply change the depth of field, and the exposure is automatically maintained constant.

Backlight Correction — Intelligent Auto Iris Function

The auto iris function on this unit has two modes of operation: normal and intelligent. In the intelligent mode the intelligent auto iris function operates, allowing you to shoot a backlit subject with an appropriate exposure. When the background is very bright, as when backlit, the lens aperture is opened somewhat more than normal, and when the foreground is very bright the lens aperture is reduced compared with the normal setting.
The factory default setting is to enable the intelligent auto iris function, but you can change this as follows.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



2 Use the UP/ON and DOWN/OFF buttons to select the setting.

Selection required	Operation
Intelligent auto iris function operating	Set to "INTELLIGENT".
Intelligent auto iris function not operating	Set to "NORMAL".

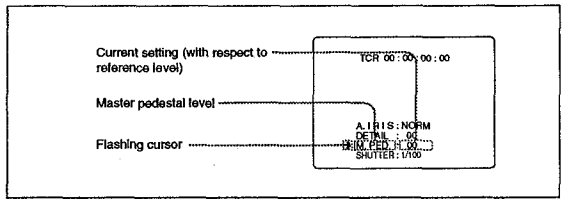
Note

The intelligent auto iris function may not be effective in some cases, depending on the position and size of the subject. To get maximum effect from this function, make the subject occupy at least one-third of the screen area in the center.

Pedestal Level

To set the contrast, for outdoor shooting for example, adjust the master pedestal level, the video reference level.
Increasing the level makes the image of a dark location brighter, and decreasing the level makes the image darker. You can adjust the value between –30% and +30% from the reference level (0.35 V) in steps of approximately 0.3%.
The setting is saved in memory and preserved when the unit is powered off.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



2 Use the UP/ON and DOWN/OFF buttons to change the master pedestal level.

Setting change	Operation
To increase the level	Press the UP/ON button.
To decrease the level	Press the DOWN/OFF button.
To return to the reference level (00)	Press the UP/ON button and DOWN/OFF button simultaneously.

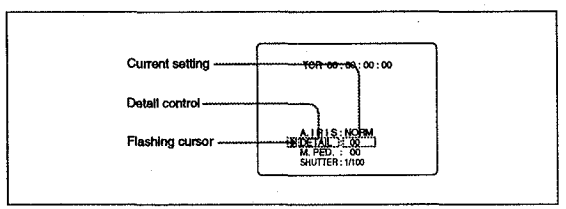
Detail Level

By changing the setting of the detail level, you can control the degree of emphasis given to outlines in the image. Increasing the emphasis gives the image a certain quality of sharpness, whereas decreasing it imparts a softer aura. You can adjust the detail level between –99 and +99. The factory default setting is 00.

Note

If you increase the detail level at the MID or HIGH gain setting, the image will be made sharper, but noise is likely to occur.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



2 Use the UP/ON and DOWN/OFF buttons to change the detail level.

Setting change	Operation
To increase the level	Press the UP/ON button.
To decrease the level	Press the DOWN/OFF button.
To return to the reference level (00)	Press the UP/ON button and DOWN/OFF button simultaneously.

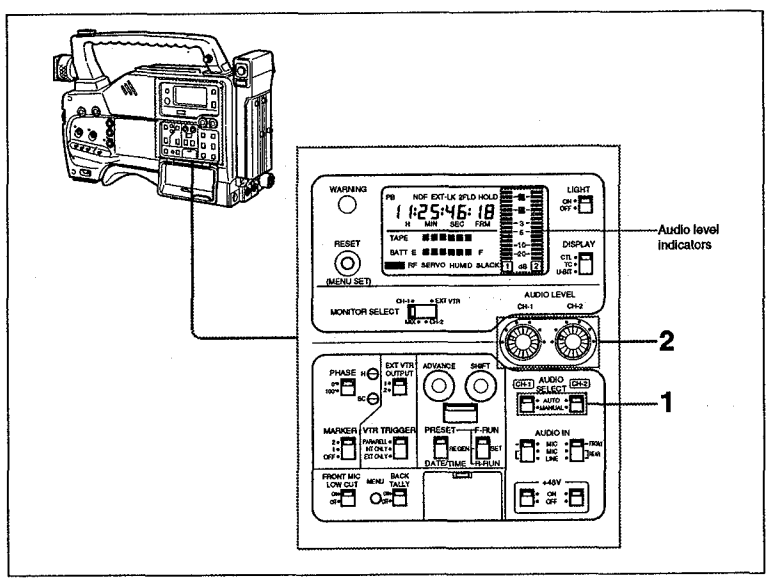
Audio Levels

This section describes the following adjustments.

- Manual audio recording level adjustment (CH-1/CH-2)
- Adjusting channel 1 audio recording level while looking into the viewfinder
- Selecting the audio level indication in the viewfinder (CH-1/CH-2)

Manual audio recording level adjustment (CH-1/CH-2)

If the AUDIO SELECT (CH-1/CH-2) switches are in the AUTO position, the audio recording levels are controlled automatically. To control the audio levels manually, carry out the following procedure.
Do this after selecting the input signals for each of the audio channels using the AUDIO IN (CH-1/CH-2) switches.



Adjusting the audio recording levels

Audio Levels

1 Set the AUDIO SELECT switch for the channel or channels you wish to adjust manually to MANUAL.

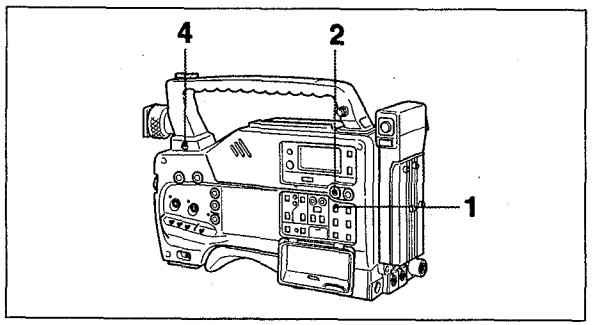
2 Watching the audio level indicators in the display window, turn the AUDIO LEVEL knob or knobs for the channel or channels you wish to adjust.

Note

Ensure that the maximum audio level does not exceed 0 dB.

Adjusting channel 1 audio recording level while looking into the viewfinder

The AUDIO LEVEL CH-1 knob by the side of the front end of the carrying handle allows you to adjust the recording level of audio channel 1 manually while looking into the viewfinder.



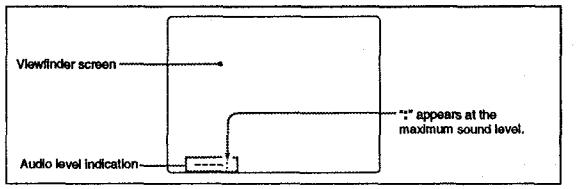
Adjusting channel 1 audio recording level with AUDIO LEVEL CH-1 knob

1 Set the AUDIO SELECT (CH-1) switch to MANUAL.

2 Turn the AUDIO LEVEL (CH-1) knob on the side panel fully clockwise.

3 In the viewfinder menu display, set AUDIO IND to "CH1" using the procedure on page 5-17.
The audio level indication for channel 1 appears on the viewfinder screen.

4 Turn the AUDIO LEVEL CH-1 knob by the carrying handle so that ":" appears at the right-hand end of the audio level indication when the sound level is maximum.



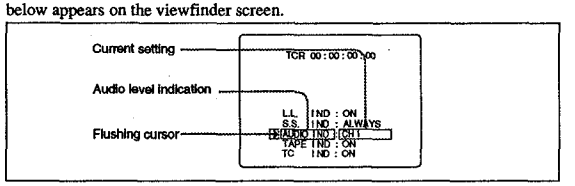
If it is not possible to obtain an optimum audio level
The maximum attenuation provided by the AUDIO LEVEL CH-1 knob by the carrying handle is about 20 dB. If this range is not sufficient to reach the optimum level, adjust the level using the AUDIO LEVEL (CH-1) knob on the side panel.

Combining the use of the two audio level controls for channel 1
Normally, leave the AUDIO LEVEL CH-1 knob by the carrying handle turned fully clockwise, and adjust the audio level with the knob on the side panel. Then use the knob by the carrying handle to make adjustments during recording if the sound level suddenly increases.

Selecting the audio level indication

The audio levels for both channels are always shown in the display window, both for playback and recording, but you can also have an audio level indication for a selected channel in the viewfinder.
To select whether to have an audio level indication in the viewfinder, and if so which channel to indicate, carry out the following procedure.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



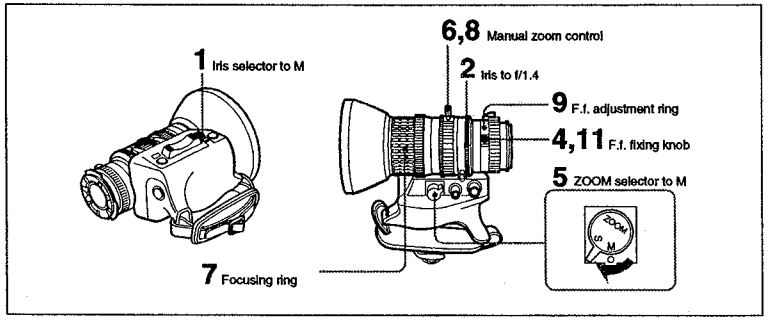
2 Use the UP/ON and DOWN/OFF buttons to select the audio level indication.

Selection required	Operation
No level indication	Set to "OFF".
Audio level indication for channel 1	Set to "CH1".
Audio level indication for channel 2	Set to "CH2".

Adjusting the Flange Focal Length

This section describes how to adjust the flange focal length. This needs adjustment in the following cases:

- When the lens is fitted for the first time
- After changing lenses
- If the lens does not stay properly in focus as you zoom from telephoto to wide angle



Adjusting the flange focal length

1 Set the iris selector to M.

2 Turn the iris ring to adjust the aperture to f/1.4 (fully open).

3 Set up a flange focal length adjustment chart at 3 meters from the camera, and adjust the lighting to obtain a suitable video level at f/1.4.

4 Release the F.f. fixing knob.

5 Set the ZOOM selector to M.

6 Turn the manual zoom control to the telephoto position (105).

7 Point the camera at the chart, and use the focusing ring to focus on it.

8 Turn the manual zoom control to the wide angle position (7.5).

9 Turn the F.f. adjustment ring until the chart is again in focus, being careful not to disturb the focusing ring.

10 Repeat steps **6** to **9** until the lens is in focus at both telephoto and wide angle positions.

11 Tighten the F.f. fixing knob.

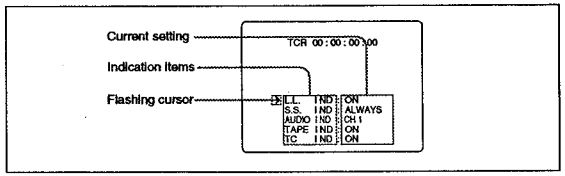
Selecting the Low Light, Tape Remaining and Time Value Indications

Of the items shown in the viewfinder display, you can select whether or not and in some cases how to display the following indications.

- Low light indication
- Tape remaining indication
- Time value indication

This section describes how to select whether or not to display these indications.

1 Press the DISP CHG switch down repeatedly until the menu screen shown below appears on the viewfinder screen.



2 Use the DISP CHG switch to select the required item with the flashing cursor.

Indication item	Representation in the menu
Low light indication	L.L. IND
Tape remaining indication	TAPE IND
Time value indication	TC IND

3 Use the UP/ON and DOWN/OFF buttons to make the selection.

Selection required	Operation
Indication not displayed	Press the UP/ON button to set to "ON".
Indication not displayed	Press the DOWN/OFF button to set to "OFF".

Fitting/Replacing the Lithium Battery

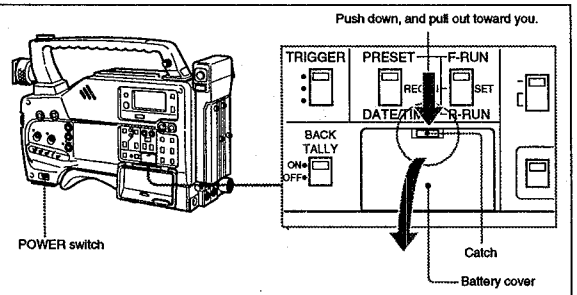
The lithium battery is needed to maintain some of the internal settings of the unit. **When using the unit for the first time, be sure to fit the lithium battery (type CR2025 button cell) supplied with the unit.** Using the unit without the lithium battery may result in faulty operation.
If the voltage of the lithium battery falls, a warning indication (Li) appears in the display window. If this warning appears, replace the lithium battery **within two or three days,** using a type CR2025 button cell.
Use the following procedure to replace the lithium battery.

Note

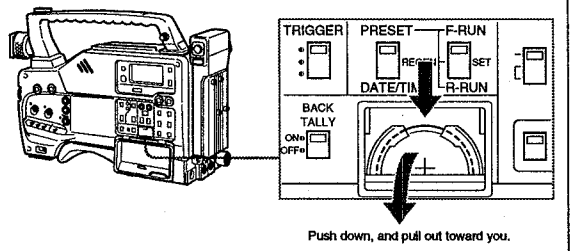
Read the instructions for the lithium battery carefully when fitting or exchanging the lithium battery. **Mishandling of a lithium battery may result in an explosion.**

1 Turn the POWER switch on.

2 Press down the catch at the top of the battery cover, and pull toward you.



3 Take out the lithium battery.



4 Reverse step **3** to insert a replacement lithium battery.
Take care that **the positive side of the battery, marked with a plus sign is toward you.**

5 Reclose the battery cover.

The lifetime of the lithium battery is approximately two years.

Using the VTR Menu

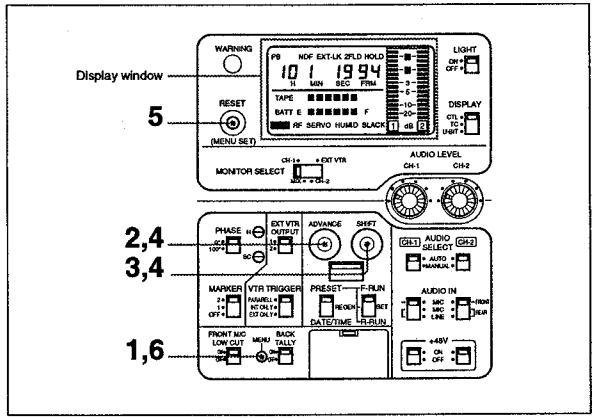
The VTR menu provides the following functions.

VTR menu functions

Function	Menu number
Real time clock and calender settings	101
Cumulative hours counts: • Head drum operating hours • Tape transport operation hours • Operating hours (total with power on)	201
NTSC drop-frame/non-drop-frame mode	204
Standby period setting	207

(In the following description, an underscore indicates a portion of the display which is flashing.)

Basic procedure for settings in the VTR menu



Basic procedure for settings in the VTR menu

1 Press the MENU button.
The "DIAG" indication appears in the display window, and the time code display indicates "101 1994".

2 Press the ADVANCE button to change the leading three-digit number in the time code display to the required menu number.

3 Press the SHIFT button.
The current setting appears. Part of the setting flashes to indicate that it can currently be changed.

4 Use the SHIFT button to switch to the next portion to set, and use the ADVANCE button to change the value of the current flashing portion.

5 Press the RESET/(MENU SET) button.
This stores the settings, and once again displays the menu number flashing.

6 Press the MENU button.
The display window returns to the state before entering the VTR menu.

Setting the real time clock and calendar

1 Select menu number 101, and press the SHIFT button.
The current date setting appears as an eight-digit number in the setting mode format (yyyymmdd). For example, "19940825" is August 25, 1994.

Note

It is not possible to change the first two digits of the year.

2 Use the SHIFT and ADVANCE buttons to obtain today's date.

Ending the setting
Press the RESET/(MENU SET) button, then the MENU button, to exit the VTR menu.
The date set appears in the mmddyyyy format for NTSC versions (e.g. August 25, 1994 is displayed as "08251994") or in the ddmmyyyy format for PAL versions (e.g. August 25, 1994 is displayed as "25081994").

Continuing to set the time
Proceed to step **3**.

3 With the day display flashing in the setting mode format, press the SHIFT button.
The current time setting appears as a six-digit number, in 24-hour representation (hhmmss). For example,"221505" is 22:15 and 5 seconds.

4 Use the SHIFT and ADVANCE buttons to obtain the current time.

5 Press the RESET/(MENU SET) button, then the MENU button, to exit the VTR menu.
The real time clock starts advancing from the setting at the point when you press the RESET/(MENU SET) button.
The date set appears in the mmddyyyy format for NTSC versions or in the ddmmyyyy format for PAL versions as described in step **2** above.

Displaying the head drum/tape transport/total operation hours

1 Select menu number 201, and press the SHIFT button.
Pressing the SHIFT button cycles through the following displays:
- Head drum operating hours (e.g. "A 0492Hr")
- Tape transport operation hours (e.g. "b 0720Hr")
- Total operating hours (e.g. "C 0835Hr")
- Menu number indication ("201 00 ")

2 After checking the displays, press the SHIFT or RESET/(MENU SET) button to redisplay the menu number.

3 Press the MENU button, to exit the VTR menu.

Selecting drop-frame/non-drop-frame mode (NTSC)

1 Select menu number 204.
The current setting appears beside the menu number (e.g. "204 dF ").
dF: drop-frame mode (factory default)
ndF: non-drop-frame mode

2 Press the SHIFT button to make the frame mode indication flash (e.g. "204 dF "), then press the ADVANCE button.
This toggles the mode between "dF" and "ndF".

3 Press the RESET/(MENU SET) button, then the MENU button, to exit the VTR menu.
The new setting is saved when you press the RESET/(MENU SET) button.

Setting the standby period

The standby period is the maximum length of time (in minutes) that the unit will remain in the paused state before automatically removing the tape tension.

1 Select menu number 207.
The current setting appears beside the menu number (e.g. "207 08 ").

2 Press the SHIFT button to make the minute count flash (e.g. "207 08 "), then press the ADVANCE button.
Pressing the ADVANCE button cycles through the possible settings:
08 (factory default) → 01 → 03 → 05

3 Press the RESET/(MENU SET) button, then the MENU button, to exit the VTR menu.
The new setting is saved when you press the RESET/(MENU SET) button.

Chapter 6
Advanced Recording and Playback Operations

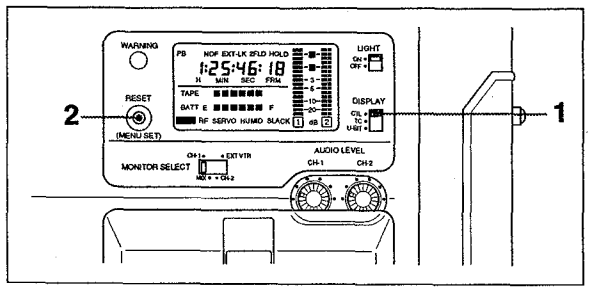
This chapter describes how to record time values to aid indexing for the editing stage, how to synchronize a number of camcorders, simultaneous recording on an external VTR, and how to carry out color playback.

Recording Time Values

This section describes settings for three different techniques for identifying recordings, using the resettable counter, the time code signal, or the user bits included in the time code signal.

Setting the Counter

The counter counts the pulses of the CTL signal on the tape, and when the DISPLAY switch is set to CTL, displays the count value on the viewfinder screen and in the display window, converted to hours, minutes, seconds and frames. The counter value is not, however, displayed in the viewfinder during playback.
Use the following procedure to set the counter value.



Setting the counter value

1 Set the DISPLAY switch to CTL.
The counter value appears in the display window.

2 Press the RESET/(MENU SET) button.
This resets the value displayed in the viewfinder and display window to "0:00:00:00". The counter then advances as recording proceeds, counting hours, minutes, seconds and frames.

If you rewind the tape after pressing the RESET/(MENU SET) button
The value turns negative, showing a minus sign.

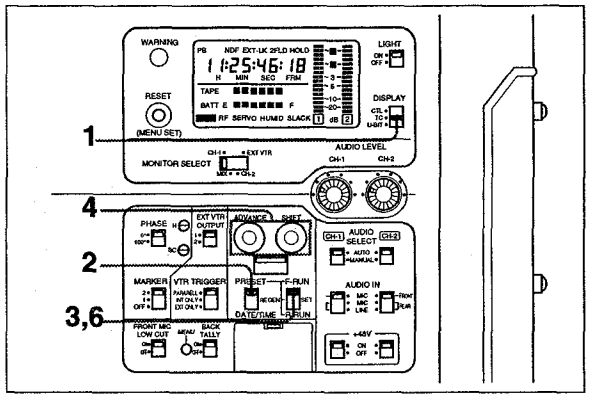
Setting the Time Code Value

If you are using both time code and user bit values, it is recommended to set the user bit value first.
The time code value can be set anywhere in the range from 00:00:00:00 to 23:59:59:29 (NTSC) or 23:59:59:24 (PAL).

For details of the user bit setting, see the section "Setting the User Bit Value" (page 6-5).

Note

This unit uses SMPTE (NTSC)/EBU (PAL) time code (LTC) for both recording and playback. It is not compatible with other types of time code.



Setting the time code value

1 Set the DISPLAY switch to TC.

2 Set TC mode switch 1 to PRESET.

3 Set TC mode switch 2 to SET.

4 Use the SHIFT button to select the digits to set, and the ADVANCE button to change the value, until the required time code value is displayed.

5 If necessary (NTSC only), select the frame mode (DF/NDF).

For details of the frame mode selection, see the section "Selecting drop-frame/non-drop-frame mode (NTSC)" (page 5-23).
For an explanation of drop-frame and non-drop-frame modes, see the section "Drop-frame mode (NTSC only)" (page 6-4).

6 Set TC mode switch 2 to the time code running mode as shown in the following table.

Mode	TC mode switch 2 setting	Effect
Free run: The time code value advances continuously whether recording or not.	F-RUN	The time code value starts advancing immediately.
Record run: The time code value advances only while recording.	R-RUN	The time code value starts advancing when you start recording, and stops between recording sessions.

Recording Time Values

Resetting the time code value

In step **4** of the procedure above for setting the time code, press the RESET/(MENU SET) button. This resets the displayed time code to "00:00:00:00", and this value flashes.

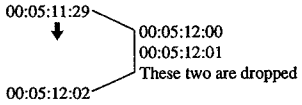
Note

If TC mode switch 1 is set to REGEN or DATE/TIME, it is not possible to reset the time code value.

Drop-frame mode (NTSC only)

In the NTSC standard, the time code value is based on 30 frames per second, but the exact video frame frequency is in fact 29.97 frames per second. There is thus a 0.1% discrepancy between the time counted at 30 frames per second and the real time, or 18 frames per 10 minutes.
Drop-frame mode corrects for this by skipping two frame counts at the beginning of every minute which is not a multiple of ten.

For example:



In non-drop-frame mode, however, no frame counts are omitted, and there is a gradual deviation of the time code time from real time.

Making the time code continuous

In recording-run mode (when TC mode switch 2 is set to R-RUN), recording a number of scenes on the tape normally produces continuous time codes. If, however, you take the cassette out at some point, the time code will no longer be continuous.

1 Set TC mode switch 1 to REGEN.

2 Use the tape transport buttons to play back.

3 Watching the playback on the monitor, find the end point of the previous recording on the tape from which you wish to continue recording, and press the STOP button.
The tape stops.

4 Press the REC REVIEW button.
This reads the end of the previous recording, and synchronizes the internal time code generator, thus allowing the new time code recorded to follow on consecutively.

Setting the User Bit Value

You can use the user bits to record any identifying code number on the time code track on the tape: this may be the date, time or scene number, for example. User bit values are always expressed as eight-digit hexadecimal values (base 16).

1 Set the DISPLAY switch to U-BIT.

2 Set TC mode switch 1 to PRESET.

3 Set TC mode switch 2 to SET.

4 Use the SHIFT button to select the digits to set, and the ADVANCE button to change the value, until the required user bit value is displayed.

Indications of hexadecimal digits A to F (10 to 15) on the display.

Digit	A	B	C	D	E	F
Display	*A*	*b*	*C*	*d*	*E*	*F*

5 Set TC mode switch 2 to F-RUN (free-run) or R-RUN (record-run).

Resetting the user bit value

In step **4** of the procedure above, press the RESET/(MENU SET) button. This resets the displayed user bit value to "00 00 00 00".

Setting the time code to the real time clock and calendar

Set TC mode switch 1 to DATE/TIME.
This synchronizes the time code generator to real time and date, using the real time clock and calendar set in the VTR menu. Once you set this switch to the DATE/TIME position, it is not possible to retrieve the previous value in the time code generator.

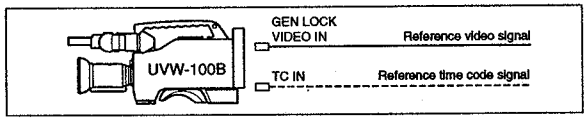
For how to set the real time clock and calendar, see the section "Setting the real time clock and calendar" (page 5-22).

External Synchronization

This section describes the procedures involved in external synchronization of the camcorder, when using two or more camcorders synchronized for operation with a special effects unit, for example.

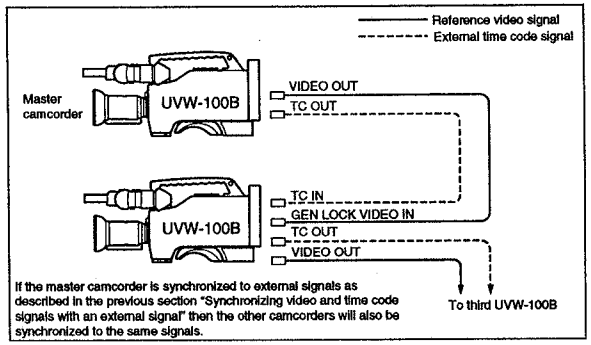
Synchronizing video and time code signals with an external signal

Connect the external reference video and time code signals as shown in the following figure.



Connecting external reference video and time code signals

Synchronizing two or more camcorders



Connections for synchronizing two or more camcorders

Phase alignment of the video signals

1 Adjust the subcarrier phase roughly using the PHASE switch.

2 Adjust the subcarrier phase finely using the SC knob, while checking on a Vectorscope.

3 Adjust the horizontal phase using the H knob, checking the waveform on an oscilloscope.

Phase alignment of the time code signals

1 Turn the main unit POWER switch on.

2 Set TC mode switch 2 to F-RUN.

3 Set the DISPLAY switch to TC.

In this state, when you supply external video and time code reference signals, the internal time code generator locks on to the external time code signal. When the indication EXT-LK appears in the display window, the internal time code is now synchronized with the external time code. You can then disconnect the external time code signal, and within the limits of accuracy, the internal time code generator will continue advancing the time code value in synchronization with the external equipment.

Notes

- After synchronizing with the external signal, wait a few seconds while the internal synchronizing circuits stabilize before beginning recording.
- The external synchronization affects only the time code values. It is not possible to synchronize the user bit values.
- When the time code generator is operating in F-RUN mode, turning the POWER switch off and on may degrade the phase alignment accuracy.
- If you change the TC mode switch settings made in the above procedure, the time code stops advancing. As a result, the time code synchronization is lost and the indication EXT-LK in the display window disappears.
- Color frame locking is not possible while the internal time code generator is locked on to the external time code signal.

Recording on an External VTR

This section describes how to make recording when an external VTR is connected.

Types of external VTR which can be connected

The VTRs which can be connected and the interface cables required are as shown in the following table.

VTRs which can be connected and cables required

VTR	Cable
BVW-35/35P/50/50P portable VTR, etc.	CCZ-A camera cable (max. length 10 m)
VO-8800/8800P U-matic VTR, etc.	CCZQ-A camera cable (max. length 10 m)

Notes on connecting an external VTR

- It is not possible to connect a camera control unit.
- There is no power supply connection between the units. You must therefore provide separate power supplies.
  The battery indications (LOW BATT, BATT.END) in the viewfinder applies only to the battery pack on the UVW-100BK/100BPK/100BL/100BPL/100BF/100BPF.
  The tally lamp on the viewfinder front and the REC/TALLY and BATT indicators in the viewfinder also reflect the state of the external VTR. Therefore, when recording simultaneously on internal and external VTRs, if either develops a fault, the indicators give a warning. In this case, it is necessary to check, by looking at the indications on the two units, which one is causing the problem.
- To monitor the audio and audible warning indications from the external VTR, using the speaker on this unit or the EAR connector, set the MONITOR SELECT switch to EXT VTR.

Simultaneous External and Internal Recording

Connections

Connect the EXT VTR connector on this unit to the CAMERA connector on the external VTR, and set the audio input level on the external VTR to –20 dB.

Switch settings on this unit

1 Set the VTR TRIGGER switch to PARALLEL.

2 Depending on the VTR connected, set the EXT VTR OUTPUT switch to 1 (component/composite video output) or 2 (Y/C output).

Recording

1 Put the external VTR in the recording paused state.

2 Press the VTR button on the camcorder body or lens.
The external and internal VTRs start recording simultaneously.

3 To pause simultaneous recording, press either VTR button again.
Both VTRs go into the recording paused state (standby on).

Changing the setting of the VTR TRIGGER switch during simultaneous recording

Depending on the setting, the VTR buttons now control only one of the VTRs.
A VTR which was recording continues recording.

If either VTR comes to end of tape during recording

Even if one VTR stops at the end of tape, the other will continue recording.

To restart simultaneous recording

- When the internal VTR has run out of tape, change the cassette, and press either VTR button. The external VTR will continue recording through this interval.
- When the external VTR has run out of tape, change the cassette, and restart recording with the controls on the external VTR. The internal VTR will continue recording through this interval.

Note

After replacing the cassette on the external VTR, do not press the VTR button on the camcorder, as this will pause the internal VTR.

Using the viewfinder for playback

For the internal VTR: Press the PLAY button.
For the external VTR: While holding down the lens RET button, you can see the return video from the external VTR.

Controlling Only the Internal VTR with the VTR Buttons

Set the VTR TRIGGER switch to INT ONLY.
Even if an external VTR is connected, the two VTR buttons control only the internal VTR. It is then necessary to start and stop recording on the external VTR using its own controls.

Recording on the External VTR Only

Connections and switch settings

With the connections the same as described above for simultaneous recording, set the VTR TRIGGER switch to EXT ONLY. The VTR buttons on the camcorder body and lens now control only the external VTR.

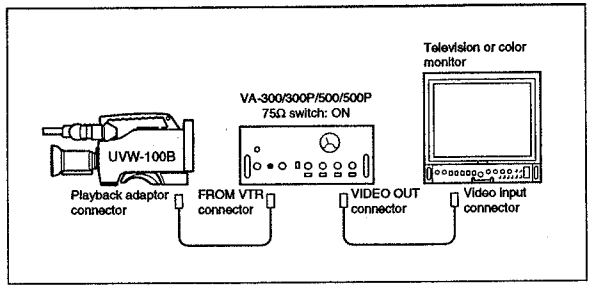
Recording

Use the controls on the external VTR to put it in the recording paused state, then press the VTR button on this unit body or lens. The external VTR starts recording.

To pause recording
To pause recording, press either VTR button again.

Color Playback

To monitor color playback video from this unit, connect a VA-300/300P/500/500P playback adaptor (not supplied) to the unit, and a television or color monitor to the VA-300/300P/500/500P as shown in the following figure, and press the PLAY button.



Color playback

Notes

- If you use the recording review function with the playback adaptor connected, the output signals to the playback adaptor are the same as the viewfinder video and audio monitor.
- If you press the STOP button when using the playback adaptor for playback, the output signals to the playback adaptor switch to E-E mode video and audio.
- When using a VA-500/500P for playback, ensure that the switches below the AUDIO LEVEL CH-3 and CH-4 adjustment knobs on the VA-500/500P are off.

Chapter 7
Maintenance

Warning System

When the unit is powered on, or if a fault occurs during operation, a warning is given in the following ways:

- By the warning indicators and messages in the viewfinder.
- By warning indications in the display window.
- By means of the WARNING indicator together with a warning tone from the speaker or earphone.

You can adjust the volume of the warning tone with the ALARM knob. When this knob is turned to the minimum position, there is no sound output at all.

Operation warnings and action to be taken

VTR				Camera		Problem	Machine action	What to do
Display window		Warning indicators	Warning tones	Viewfinder indicators				
Warning indication	State (Flashing/ Continuous)	Continuous / 1 flash/s / 4 flashes/s	Continuous / 1 beep/s / 4 beeps/s	REC	BATT			
				Continuous / 1 flash/s / 4 flashes/s	Flashing			
RF	Continuous[a]	[a]	[a]	[a]		Video head gaps clogged or problem in recording circuit.	After detecting head clogging, recording continues but quality is poor.	Clean the heads. If the problem persists, power off, and consult your Sony service representative.
SERVO	Continuous[a]	[a]	[a]	[a]		Servo lock lost.	Recording continues but quality is poor. Recording continues but quality is poor. The warning indicator may sometimes flash for a short time at the beginning of recording.	Power off, and consult your Sony service representative.
HUMID	Continuous					Condensation on head drum.	The unit stops, and all operations are inhibited except eject.	Without powering off, wait until the HUMID indication disappears.
SLACK	Continuous					The tape cannot be wound properly.	Operation stops.	Consult your Sony service representative
TAPE	Flashing[a] (1 flash/s)	[a]	[a]	[a]		Close to the end of tape.	Operation continuous.	Replace the cassette as soon as possible.
	Flashing (4 flashes/s)					End of tape.	Recording, playback or fast forward stops.	Replace the cassette or rewind.
BATT	Flashing (1 flash/s)			[b]		Battery almost exhausted.	Operation continues.	Replace the battery as soon as possible.
	Flashing (4 flashes/s)		[a]			Battery exhauseted.	Operation stops.	Replace the battery.

a) During recording or a recording paused state ("standby on") only.

b) Except during playback, fast forward, rewinding and recording review.

For details of error messages displayed in the viewfinder, see the section "Normal viewfinder display indications" (page 4-10).

Troubleshooting

You can use this chart to establish possible causes of an apparent problem; always double-check before sending the unit for repair. If a problem persists, contact your Sony service representative.

Troubleshooting chart

Symptoms	Cause	Remedy
The unit does not power on when you switch the POWER switch on.	• There is no battery pack loaded. • The battery pack has reached the end of its usable life. • The AC power adaptor is not connected.	• Load a battery pack. • Replace the battery pack with a fully charged one. • Connect the AC power adaptor.
The tape transport does not operate when you press either VTR button.	• The POWER switch is turned off. • The VTR has reached the end of tape. • The cassette has the record-inhibit plug pushed in.	• Turn the POWER switch on. • Rewind the tape, or load a new cassette. • Either load a new cassette, or pull the record-inhibit plug out.
The tape transport does not operate when you press any tape transport button.	The VTR has reached the end of tape.	Either rewind the tape, or load a new cassette.
The video and audio E-E output is not present.	The POWER switch is turned off.	Turn the POWER switch on.
The power supply cuts while operating.	The battery pack is exhausted.	Replace the battery pack with a fully charged one.
The battery goes dead very quickly.	• The operating temperature is very low. • The battery pack is inadequately charged.	Recharge the battery pack, or replace with a new fully charged battery pack.
It is not possible to eject the cassette.	• The battery pack is exhausted. • The POWER switch is turned off.	• Replace the battery pack with a fully charged one. • Turn the POWER switch on.
The playback picture quality is poor.	The video heads are dirty.	Clear the video heads using a BCT-5CLN cleaning cassette. *For details of head cleaning, see the section "Cleaning the video heads" (page 7-4).*
All controls except the EJECT button are disabled.	There is condensation on the head drum.	Remove the cassette, power off, and wait until the condensation has evaporated.
Audio recording is not possible.	The AUDIO LEVEL (CH-1/CH-2) knobs are set to the minimum level.	Adjust the setting of the AUDIO LEVEL (CH-1/CH-2) knobs.
The recorded sound is distorted.	The audio level is too high.	Adjust the setting of the AUDIO LEVEL (CH-1/CH-2) knobs, and record again.
The recorded sound has a high noise level.	The audio level is too low.	Adjust the setting of the AUDIO LEVEL (CH-1/CH-2) knobs, and record again.
The image in the viewfinder is blurred.	• The viewfinder is not focused correctly. • There is condensation on the lens.	• Adjust the viewfinder focusing ring. • Power off, and wait until the condensation has evaporated from the lens.

Care of the Unit

Cleaning the video heads

Always use the special-purpose Sony BCT-5CLN cleaning cassette for cleaning the audio and video heads. Follow the instructions with the cleaning cassette carefully, as inappropriate use of the cleaning cassette can damage the heads.

Replacing the video heads

If cleaning the video heads fails to restore picture quality, the heads may be due for replacement.
Keep a check of the hours of head drum operation: with normal use, the heads should need replacing after about 500 hours of use.
When the heads need replacement, contact your supplier or Sony service representative.

You can check the head drum operating hours using the VTR menu. For details see the section "Using the VTR Menu" (page 5-20).

Replacing other parts

For replacement of all parts other than the video heads, contact your supplier or Sony service representative.

Cleaning the lens and viewfinder

Use a blower to remove dust from the CRT screen and mirror in the viewfinder tube.
Use a commercially available lens cleaner to clean the lens and protective filter.

Note

Never use thinners or other organic solvents.

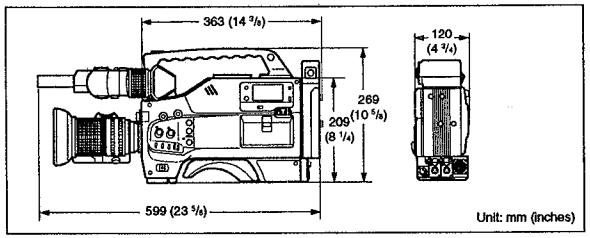
Appendix

Specifications

General

Power supply voltage	12 V DC $^{+5}_{-1}$ V AC-550/550CE AC adaptor or CMA-8A/8ACE camera adaptor is usable.
Power consumption	20 W (not including lens and viewfinder)
Continuous recording time	About 60 minutes (using NP-1B battery pack)
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Operating humidity	25% to 85% (cannot be used when condensation present)
Storage temperature	–20 °C to +60 °C (–4 °F to 140°F)
Mass	7.3 kg (16 lb 1 oz) (including DXF-601/601CE viewfinder, VCL-714BX zoom lens, NP-1B battery pack, and UVWT-30MA cassette tape)

External dimensions in mm (inches)



Video camera

General

Imaging system	Interline transfer three-chip CCD
Optical system	f/1.4 prism type
Effective picture elements	UVW-100BK/100BL/100BF: 768 × 492 (horizontal × vertical) UVW-100BPK/100BPL/100BPF: 752 ×592 (horizontal × vertical)
Minimum illumination level	4.0 lx (at f/1.4, +18 dB gain)
Sensitivity	f/11.0 standard (2000 lx, 3200K, at 89.9% reflectance)
Imaging area	6.4 × 4.8 mm ($^{9}/_{32}$ × $^{7}/_{32}$ inches)
Built-in filters	1: 3200 K 2: 5600 K + $^{1}/_{16}$ ND 3: 5600 K
Lens mounting	Bayonet mount

Video

Signal format	UVW-100BK/100BL/100BF: EIA standards, NTSC color system UVW-100BPK/100BPL/100BPF: CCIR standards, PAL color system
Scan system	UVW-100BK/100BL/100BF: 2:1 interlace, 525 lines, 60 fields/s UVW-100BPK/100BPL/100BPF: 2:1 interlace, 625 lines, 50 fields/s
Horizontal scan rate	UVW-100BK/100BL/100BF: 15.734 kHz UVW-100BPK/100BPL/100BPF: 15.625 kHz
Vertical scan rate	UVW-100BK/100BL/100BF: 59.94 Hz UVW-100BPK/100BPL/100BPF: 50.00 Hz
Synchronization	Internal or external, using BS or VBS input to GEN LOCK VIDEO IN connector
Horizontal resolution	700 lines (central portion)

Functions

Video output levels	0 dB, and MID and HIGH settings (1 dB ≤ MID < HIGH ≤ 18 dB), AGC
Electronic shutter	• Off, $^{1}/_{60}$ (UVW-100BPK/100BPL/100BPF), $^{1}/_{100}$ (UVW-100BK/100BL/100BF), $^{1}/_{250}$, $^{1}/_{500}$, $^{1}/_{1000}$, $^{1}/_{2000}$ second • Clear scan function, 59.9 to 200.3 Hz (UVW-100BK/100BL/100BF)/50.0 to 201.5 Hz (UVW-100BPK/100BPL/100BPF) • Automatic exposure (AE) function, $^{1}/_{60}$ (UVW-100BK/100BL/100BF) or $^{1}/_{50}$ (UVW-100BPK/100BPL/100BPF) to $^{1}/_{250}$ second
Video output	VBS: 1.0 V p-p, sync negative, 75 Ω
Video signal-to-noise ratio	UVW-100BK/100BL/100BF: 60 dB (standard) UVW-100BPK/100BPL/100BPF: 58 dB (standard)
Registration	0.05% overall (excluding lens distortion)
Geometric distortion	Below measurable limit (excluding lens distortion)

Specifications

VTR

General

Tape speed
UVW-100BK/100BL/100BF: Approximately 118.6 mm/s
UVW-100BPK/100BPL/100BPF: Approximately 101.5 mm/s

Recording/playback time
Using BCT-30MA/UVWT-30MA
UVW-100BK/100BL/100BF: Maximum 30 minutes
UVW-100BPK/100BPL/100BPF: Maximum 35 minutes

Fast forward time: Maximum 7.5 minutes (using BCT-30MA/UVWT-30MA)

Rewind time: Maximum 5.5 minutes (using BCT-30MA/UVWT-30MA)

Cassette tapes used: Betacam SP 1/2-inch metal tape BCT-5MA/10MA/20MA/30MA, UVWT-10MA/20MA/30MA or equivalent

Video system

Recording system
Luminance: Frequency modulation
Color difference: Time division time compression FM

Band-width	Luminance	NTSC: 30 Hz to 4.0 MHz + $^{+1.0}_{-4.0}$ dB
		PAL: 25 Hz to 5.0 MHz + $^{+1.0}_{-4.0}$ dB
	Color difference	NTSC: 30 Hz to 1.5 MHz + $^{+1.0}_{-4.0}$ dB
		PAL: 25 Hz to 1.5 MHz + $^{+1.0}_{-4.0}$ dB
S/N ratio	Luminance	NTSC: At least 49 dB
		PAL: At least 46 dB
	Color difference	At least 47 dB

Audio system

Recording system: Fixed heads

Frequency characteristics	50 Hz to 12.5 kHz + $^{+2.0}_{-3.0}$ dB
S/N ratio (at 3% distortion level for NTSC) (Referred to peak level a), weighted CCIR 468-3 for PAL)	NTSC: 70 dB or more, PAL: 60 dB or more
Distortion (THD) (1 kHz reference level)	1.5% or less
Wow and flutter	0.18% rms or less

a) Peak level= +8dB about operational level

Inputs and outputs

Input connectors

CH-1(+48V) / CH-2(+48V) (XLR 3-pin, ×2)
–60 dBu, 3 kΩ / +4 dB, 10 kΩ (0 dBu: 0.775 Vrms)
GEN LOCK VIDEO IN (BNC)
1.0 Vp-p, 75 Ω
TC IN (BNC) 0.5 to 5 Vp-p, 10 kΩ
MIC IN +48V (XLR 3-pin)
–60 dBu, 3 kΩ
DC IN (XLR 4-pin, male)

Output connectors

VIDEO OUT (BNC ×2) 1.0 Vp-p, 75 Ω
TC OUT (BNC) 1.0 Vp-p, 75 Ω
EAR (stereo mini-jack) variable –∞ to –20 dBu, 8 Ω
Playback adaptor (round, 20-pin)

External VTR connector

EXT VTR (CCZ, 26-pin)

Remote control connector (for RM-81)

REMOTE (mini-jack) Recording trigger input, tally LED output

Miscellaneous

LENS (12-pin)
VF (8-pin)
Zoom remote control (8-pin)

DXF-601/601CE viewfinder

Picture tube	1.5-inch, monochrome, quick start type
Indicators	REC/TALLY, BATT, SHUTTER, GAIN UP
Resolution	600 lines
Power supply voltage	12 V DC
Power consumption	2.1 W
Mass	660 g approx. (1 lb 7 oz)
Maximum external dimensions	236 (W) × 85 (H) × 219 (D) mm (9 3/8 × 3 3/8 × 8 5/8 inches)

Specifications

VCL-714BX zoom lens

Focal length	7.5 to 105.0 mm (5/16 to 4 1/4 inches)
Zoom ratio	14:1
Zoom operation	Manual or motorized, selectable
Maximum aperture	1:1.4 (7.5 to 75 mm) to 1:1.8 (7.5 to 105 mm)
Iris	Automatic or manual, selectable; f/1.4 to f/16 and C (CLOSED)
Subject area (at 1.1 m)	Wide angle: 880 × 660 mm (34 3/4 × 26 inches) Telephoto: 63 × 47 mm (2 1/2 × 1 7/8 inches)
Minimum focusing distance	1.1 m (43 3/8 inches), 40 mm (1 5/8 inches) in macro mode
Filter attachments	72 mm dia., 0.75 mm pitch
Mounting	Bayonet mount, 1/2 inch
Mass	1.1 kg approx. (2 lb 6 oz) (including hood)
Maximum external dimensions	110 × 186 mm (4 3/8 × 7 3/8 inches) (including hood, focus at ∞)

Supplied accessories

VCL-714BX zoom lens (with UVW-100BK/100BPK/100BF/100BPF only) (1)
DXF-601/601CE viewfinder (1)
Microphone (for +48V power supply)
VCT-U14 tripod attachment (1)
Lens mount cap (1)
Shoulder strap (1)
Flange focal length adjustment chart (1)
Lithium button cell (type CR2025) (1)
LC-421 carrying case (with UVW-100BF/100BPF only) (1)
Operation manual (1)

Design and specifications are subject to change without notice.

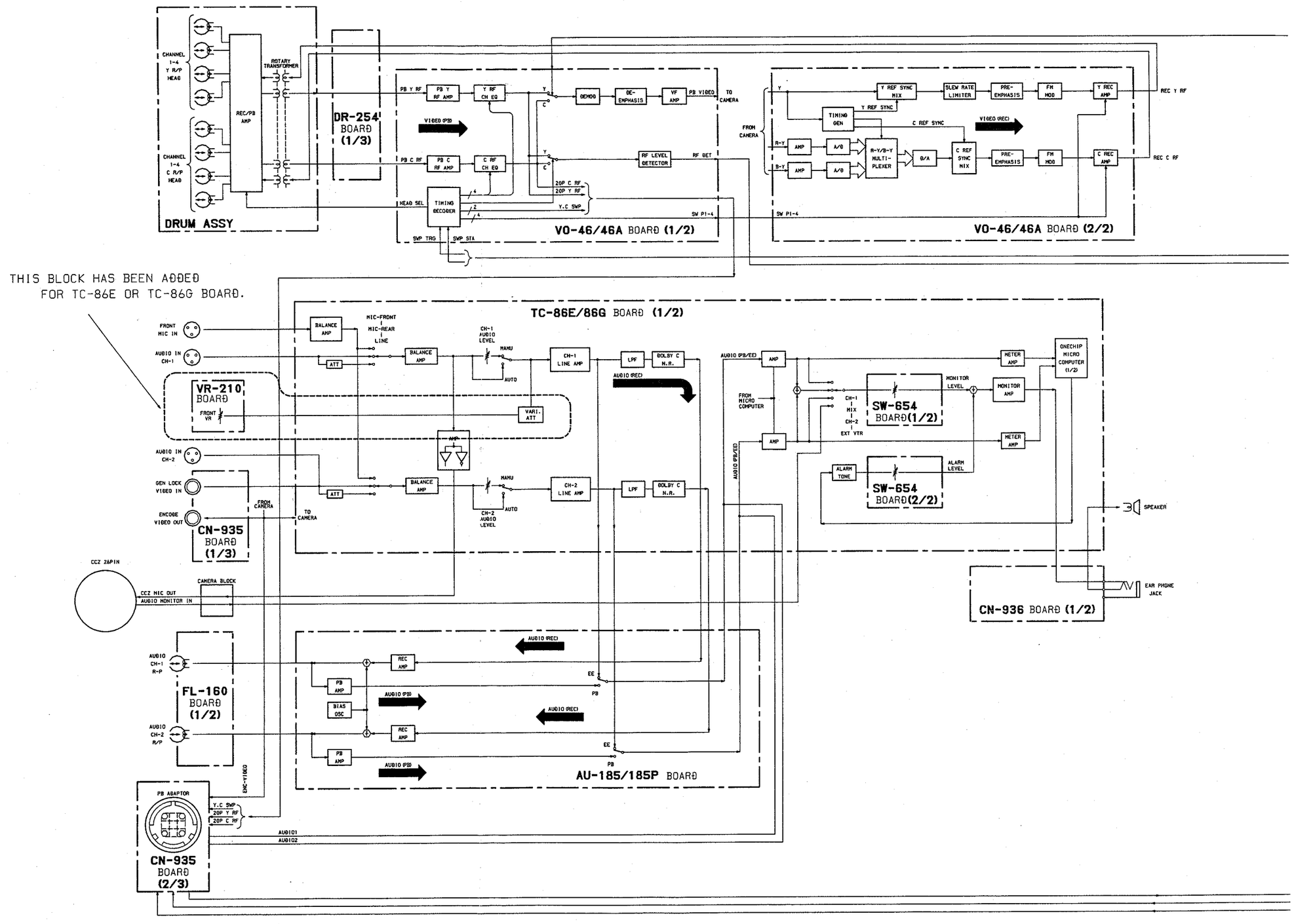
Related Equipment

DXF-40B/40BCE 4-inch viewfinder
DXF-50B/50BCE 5-inch viewfinder
NP-1B and BP-90A battery packs
BC-410/410CE and BC-1WD battery chargers
DC-520 battery adaptor (holds two NP-1B battery packs)
DC-500 battery case (for BP-90A)
AC-550/550CE and CMA-8A/8ACE AC adaptors
CAC-12 microphone holder
EC0.3C2/EC0.5C2 microphone cable
ECM-670/672 electret capacitor microphone
ME-20B earphone
WRT-810A/830A wireless microphone
WRR-810/860 UHF portable tuner
VA-300/300P/500/500P playback adaptor
RM-81 remote control unit
CAC-4 chest pad

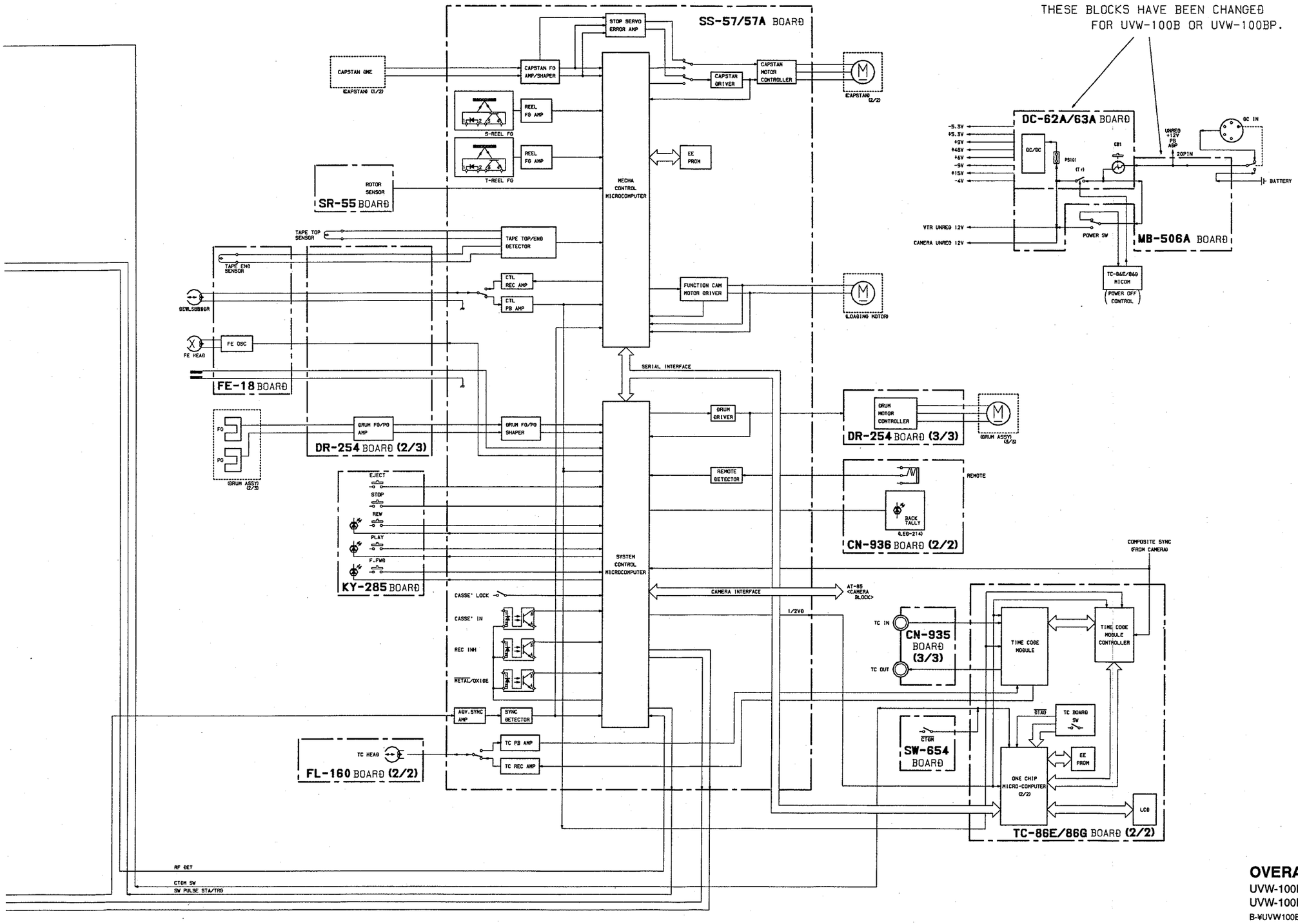
SECTION 2
BLOCK DIAGRAMS

2-1

OVERALL VTR BLOCK



OVERALL BLOCK (VTR)



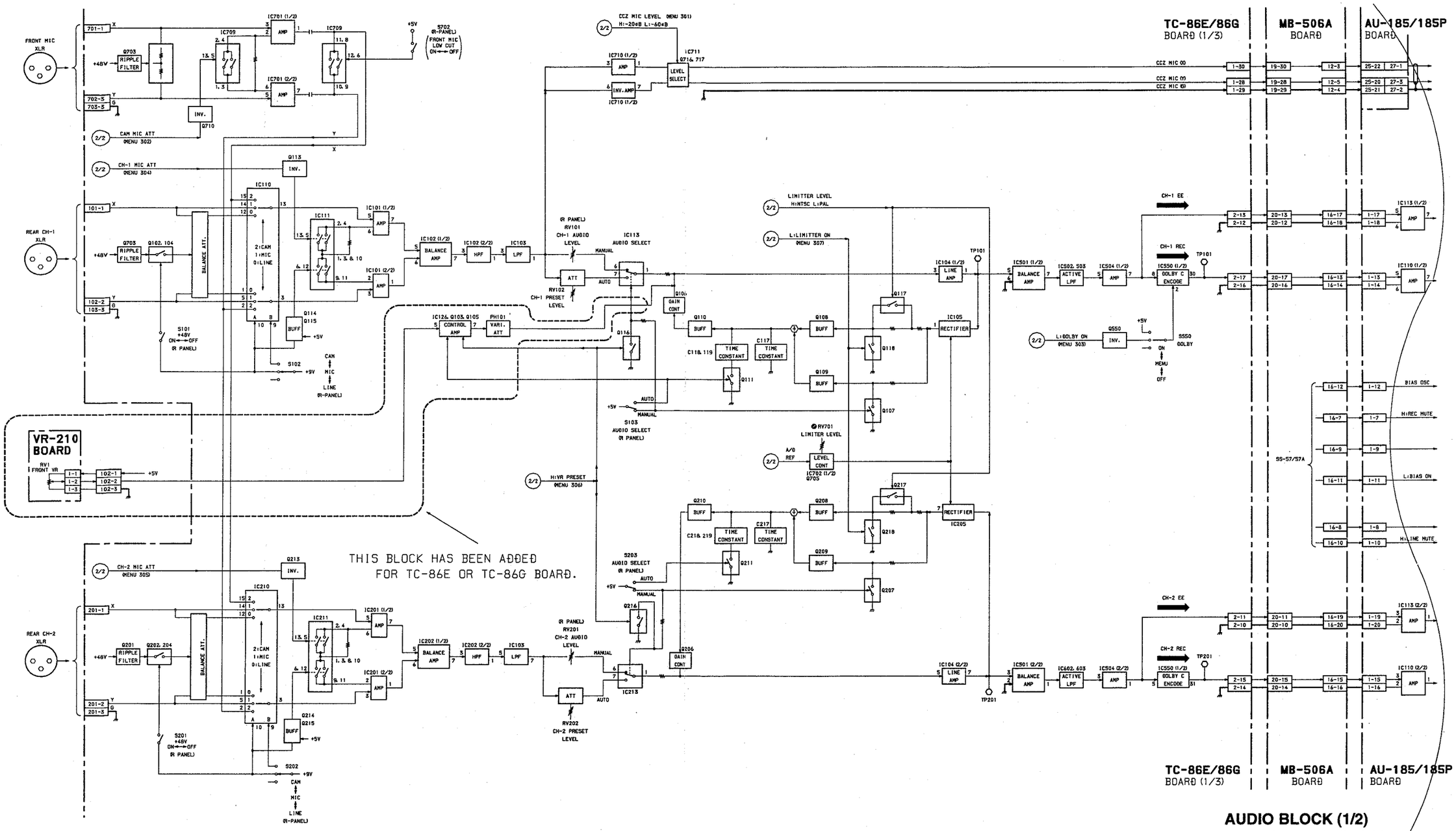
THESE BLOCKS HAVE BEEN CHANGED FOR UVW-100B OR UVW-100BP.

OVERALL VTR BLOCK

UVW-100B (J,UC)
UVW-100BP (CE)
B-¥UVW100B-VTR-OABLOCK/M

BLOCK (1/2) TC-86E / 86G (1/3) , AU-185 / 185P (1/3)

AUDIO BLOCK (1/2)



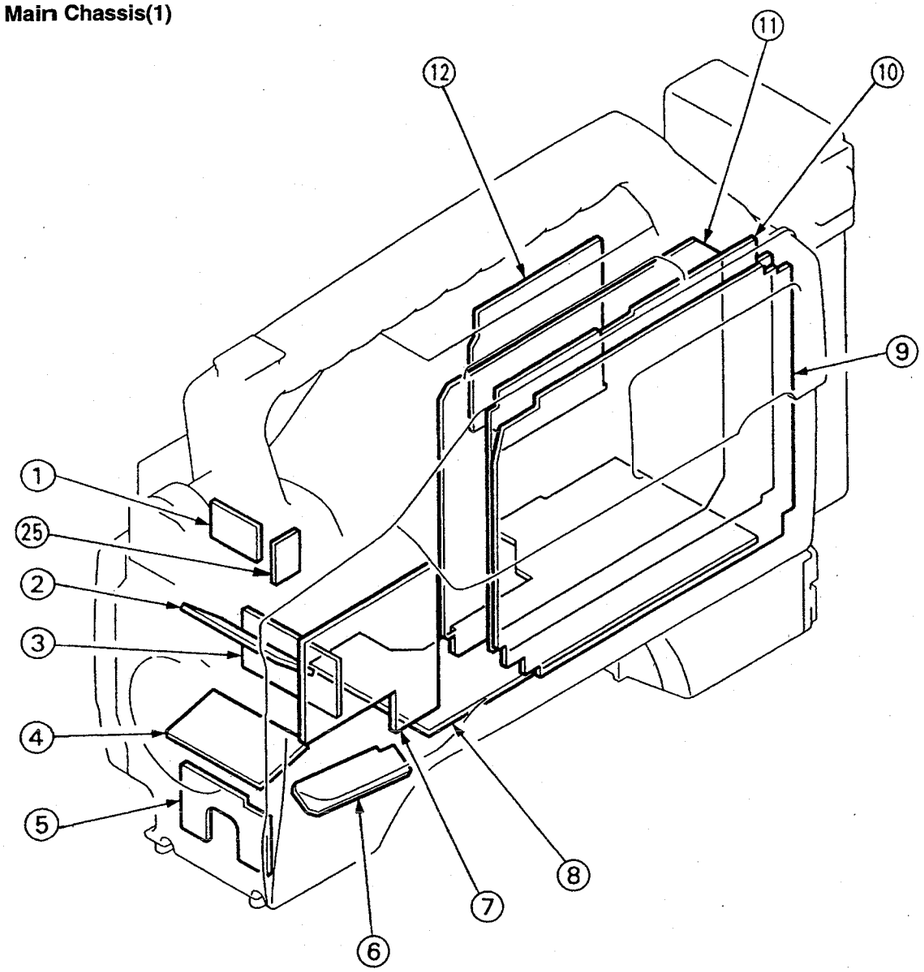
AUDIO BLOCK (1/2)
AU-185 / 185P BOARD (1/3)
TC-86E / 86G BOARD (1/3)
UVW-100B (J,UC)
UVW-100BP (CE)
B-¥UVW100B-AUDIOBLOCK/M#1

2-4

SECTION 3
SCHEMATIC DIAGRAMS AND BOARD LAYOUTS

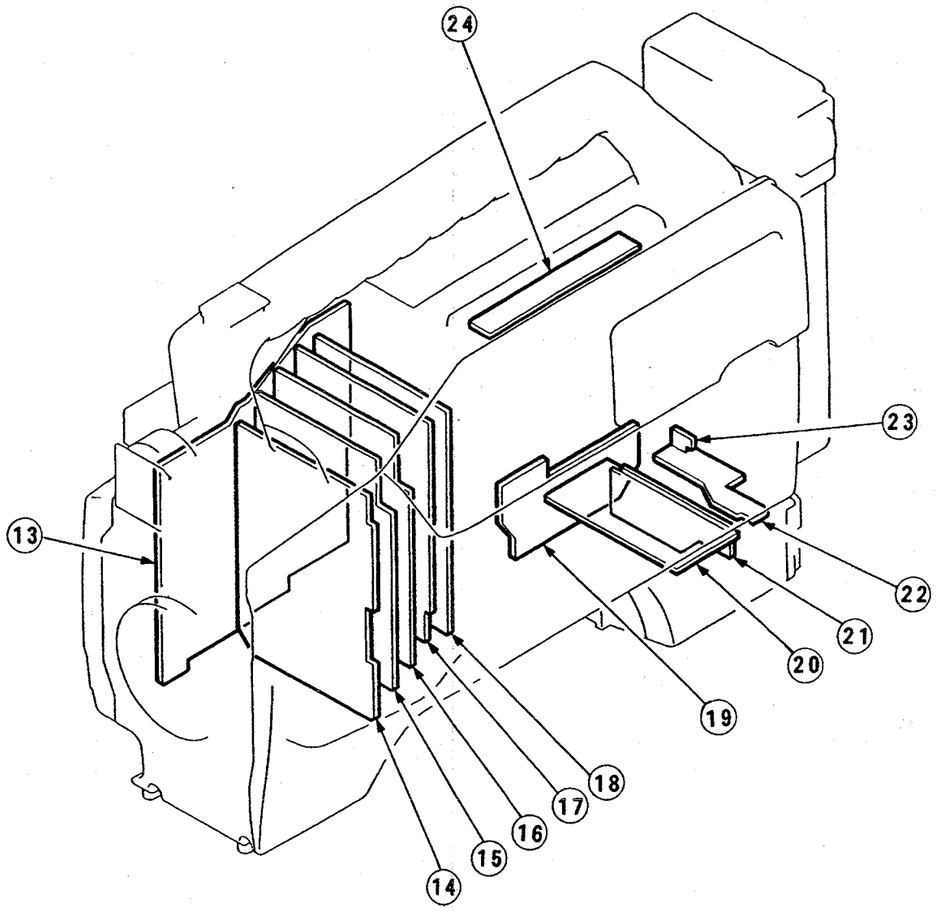
BOARD LAYOUT

Main Chassis(1)



① CN-992 Board
② PA-137C/137CP (B) Board
③ PA-137C (G) Board
④ PA-137C/137CP (R) Board
⑤ SW-656 Board
⑥ SW-655 Board
⑦ SW-654 Board
⑧ MB-506A Board
⑨ TC-86E/86G Board
⑩ VO-46/46A Board
⑪ SS-57/57A Board
⑫ AU-185/185P Board
㉕ VR-210 Board

Main Chassis(2)

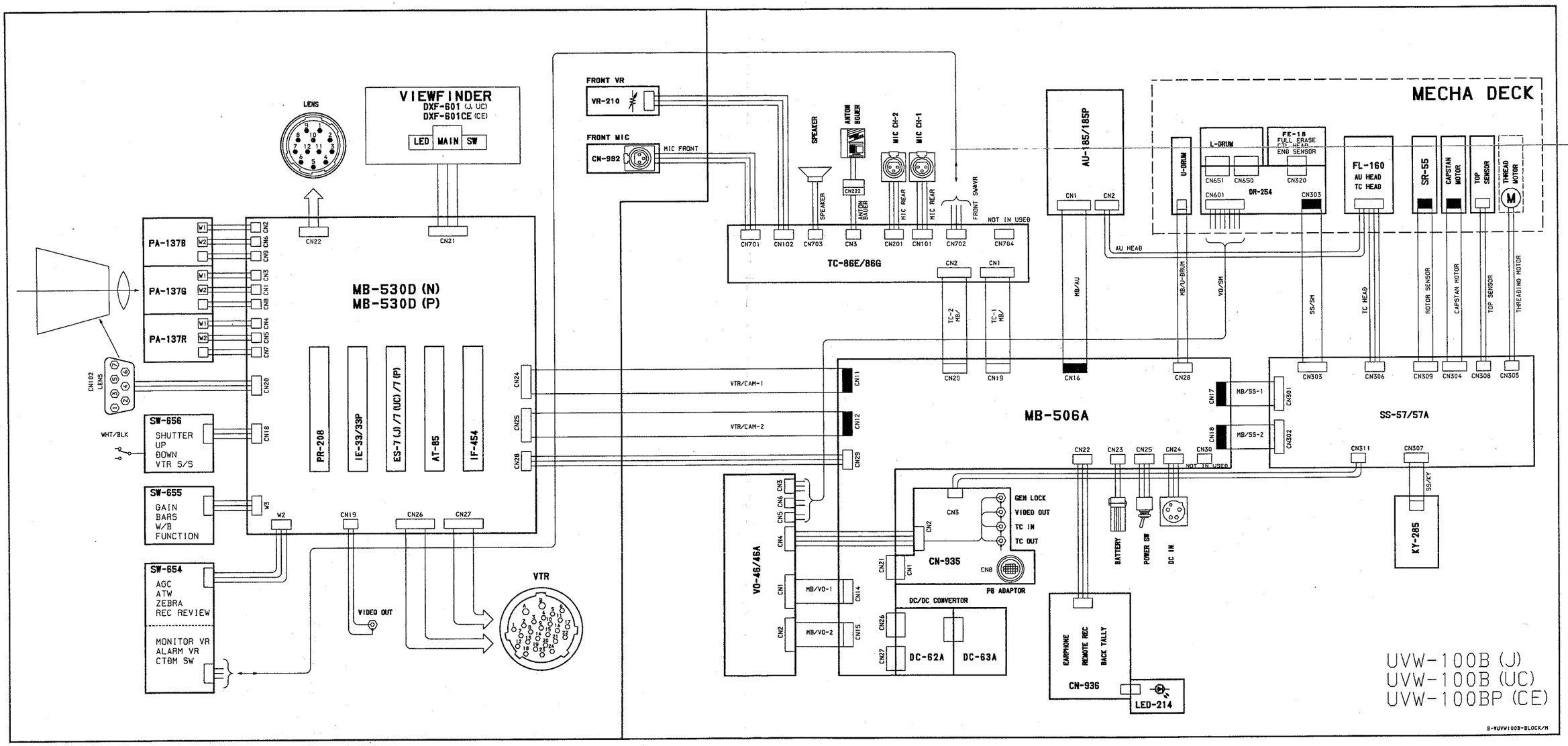


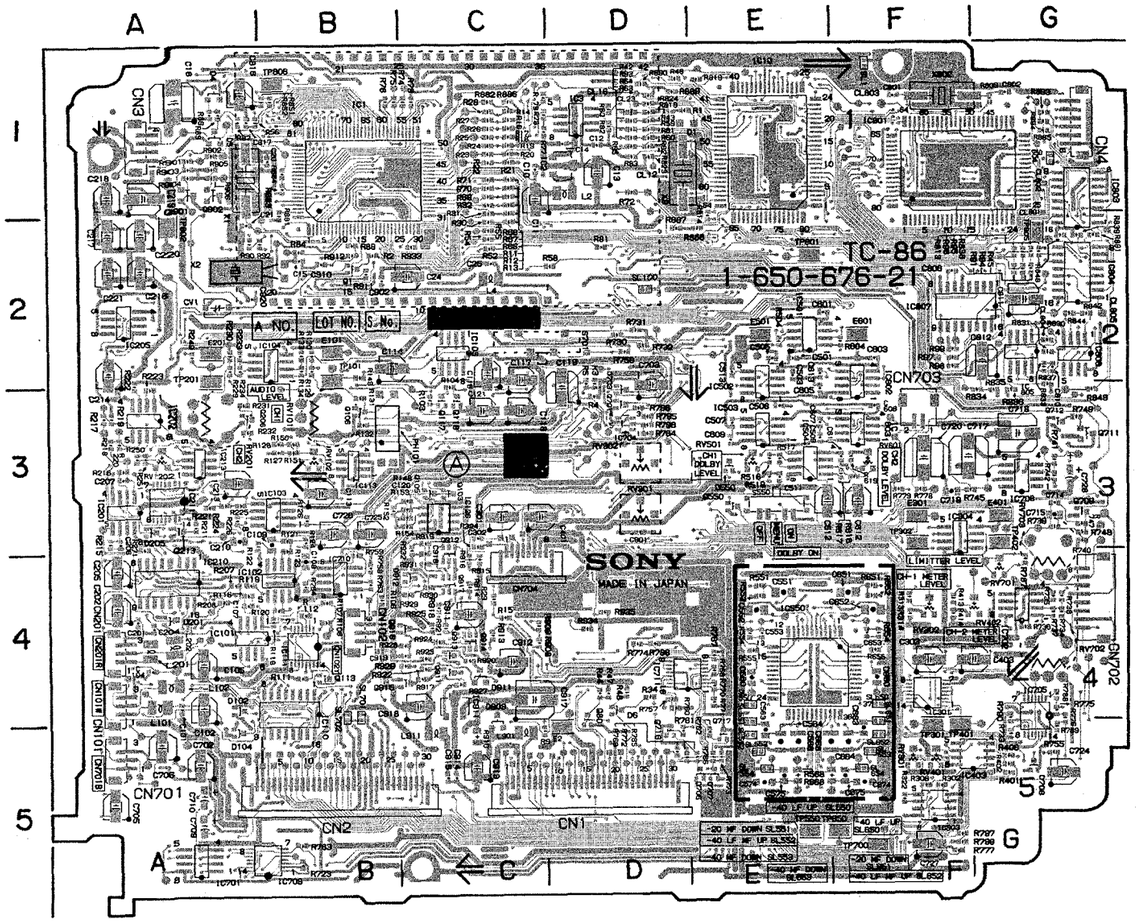
⑬ MB-530D (N)/530D(P) Board
⑭ PR-208 Board
⑮ IE-33U/33UP Board
⑯ ES-7(J)/ES-7(UC) / ES-7(P) Board
⑰ AT-85 Board
⑱ IF-454 Board
⑲ CN-935 Board
⑳ DC-62A Board
㉑ DC-63A Board
㉒ CN-936 Board
㉓ LED-214 Board
㉔ KY-285 Board

CONFIGURATION

CAMERA

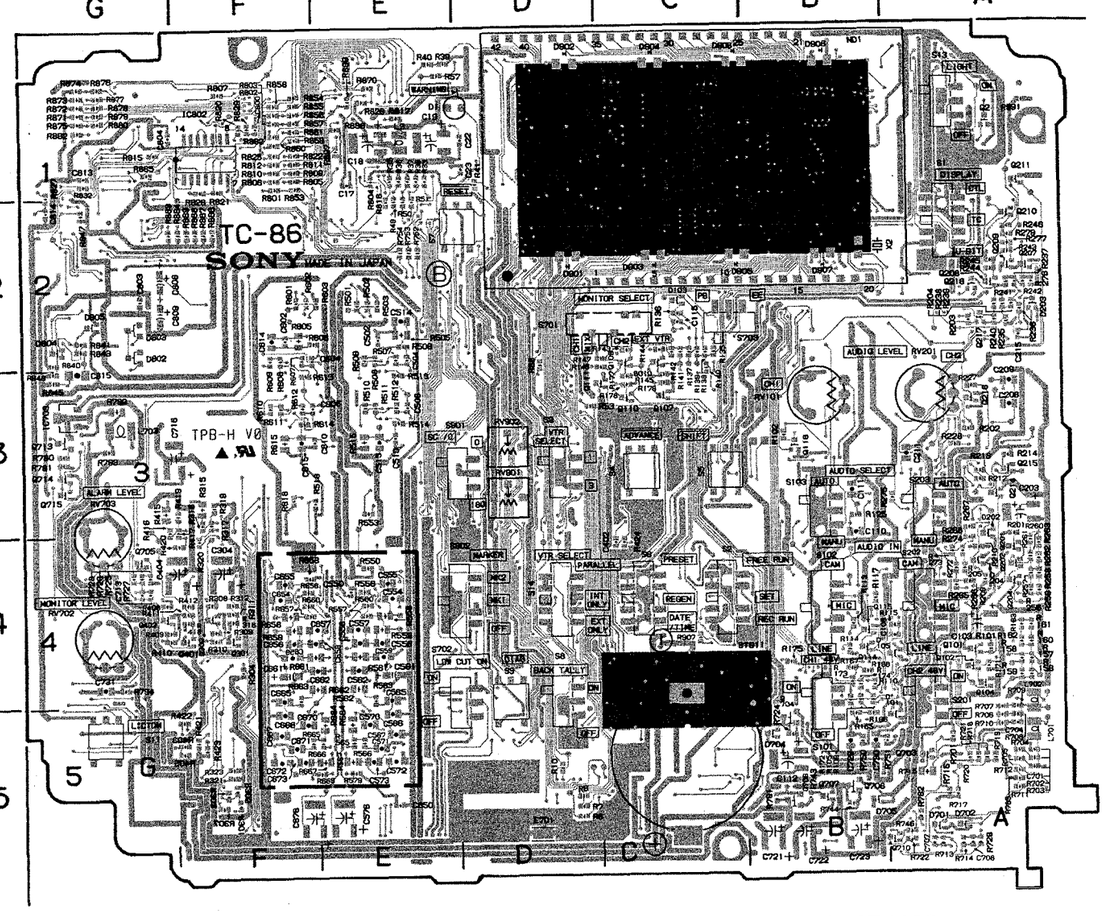
VTR





TC-86E / 86G -A side-

1-650-676-21
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)



TC-86E / 86G -B side-

1-650-676-21
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)

TC-86E/86G (1-650-676-21)

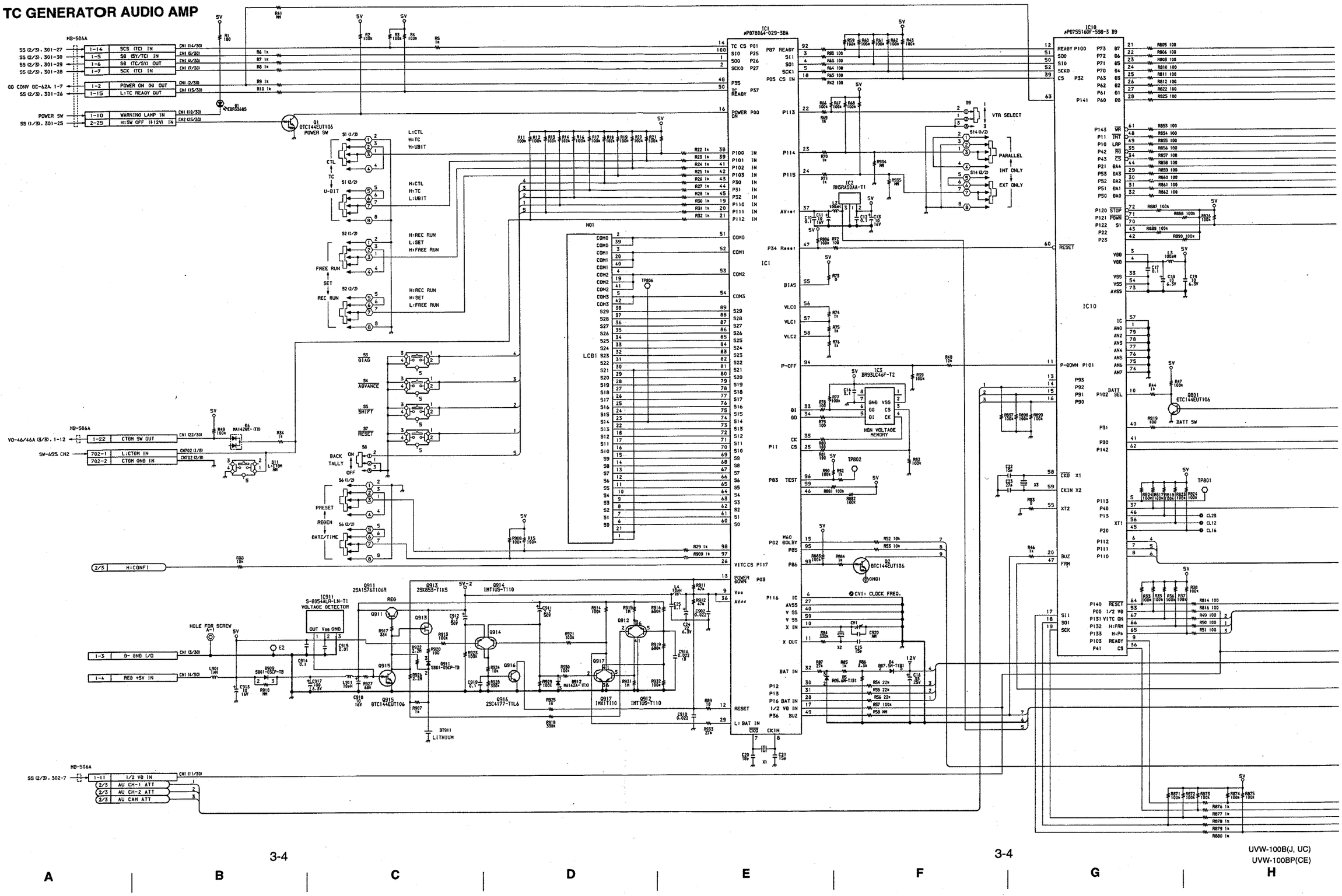
*: B SIDE

*BT911	C-5	D6	D-4	D707	E-5	E2	D-5	IC105	C-2	IC503	E-3	IC805	G-2	*ND1	C-1	Q113	B-4	*Q215	A-3	Q711	G-3	*RV101	B-3	*S8	D-4	TP201	A-2
		*D101	A-5	D708	G-5	E101	B-2	IC110	B-4	IC504	E-3	IC806	G-2			*Q114	B-4	*Q216	A-3	Q712	G-3	RV102	B-3	*S9	D-3	TP301	F-5
CN1	C-5	D102	A-4	*D802	G-2	E201	A-2	IC111	B-4	IC550	E-4	IC807	F-2	PH101	B-3	*Q115	B-4	*Q217	A-2	*Q713	G-3	*RV201	A-3	*S13	A-1	TP302	F-3
CN2	A-5	*D103	C-2	*D803	G-2	E301	F-3	IC113	B-3	IC602	F-3	IC911	C-4			*Q116	B-3	*Q218	A-2	*Q714	G-3	RV202	A-3	*S14	D-4	TP401	F-5
CN3	A-1	D104	A-5	*D804	G-2	E401	G-3	IC126	C-3	IC603	F-3			Q1	B-2	Q117	C-3	*Q301	F-4	*Q715	G-3	RV302	F-4	*S101	B-5	TP402	G-3
CN101	A-4	*D105	A-4	*D805	G-2	E501	E-2	IC201	A-3	IC701	A-5	L2	D-1	*Q2	A-1	Q118	C-3	*Q302	F-4	Q716	D-5	RV402	F-4	*S102	B-4	TP550	E-5
CN102	B-4	D201	A-4	*D901	D-2	E601	F-2	IC202	A-3	IC702	G-4	*L3	E-1	*Q101	A-4	*Q201	A-4	*Q401	F-4	Q717	E-5	RV701	G-4	*S103	B-3	TP650	F-5
CN201	A-4	*D202	A-4	*D902	D-1	*E701	D-5	IC205	A-2	*IC703	G-3	L4	C-2	*Q102	A-4	*Q202	A-4	*Q402	G-4	Q801	D-4	*RV901	D-3	*S201	A-5	TP801	E-2
CN701	A-5	*D203	A-2	*D903	C-2			IC210	A-4	IC705	G-4	L101	A-4	Q103	C-3	*Q204	A-4	Q550	E-3	Q901	A-1	*RV902	D-3	*S202	A-4	TP802	A-2
CN702	G-4	*D204	A-4	*D904	C-1	IC1	B-1	IC211	A-3	IC708	G-3	L102	A-4	*Q104	A-4	Q206	A-3	*Q703	A-5	Q902	A-1			*S203	A-3	TP805	G-2
CN703	F-3	D205	A-3	*D905	C-2	IC2	D-1	IC213	A-3	IC709	B-5	L201	A-4	Q105	C-3	*Q207	A-2	*Q704	B-5	Q911	C-4	*S1	A-2	S550	E-3	TP806	B-1
		D550	E-3	*D906	C-1	IC3	D-1	IC301	F-4	IC710	B-4	L202	A-4	Q106	B-3	*Q208	A-2	*Q705	G-4	Q912	C-4	*S2	C-4	*S550	C-2		
CV1	A-2	*D701	A-5	*D907	B-2	IC10	E-1	IC303	F-5	IC711	D-4	*L701	A-5	*Q107	C-3	*Q209	A-2	*Q706	B-5	Q913	C-4	*S3	D-4	*S701	E-4	X1	A-1
		*D702	A-5	*D908	B-1	IC101	A-4	IC304	F-3	IC801	F-1	*L702	A-5	*Q108	C-2	*Q210	A-2	*Q707	B-5	Q914	C-4	*S4	C-3	*S901	E-3	X2	B-2
*D1	D-1	*D704	B-5	D909	C-5	IC102	B-4	IC403	F-5	*IC802	F-1	*L703	G-3	*Q109	C-2	*Q211	A-1	*Q708	B-5	Q915	C-4	*S5	C-3	*S902	E-4	X3	D-1
D4	A-1	*D705	B-5	D911	C-4	IC103	B-3	IC501	E-2	IC803	G-1	L901	C-5	*Q110	C-3	Q213	A-3	Q709	G-3	Q916	C-4	*S6	C-4			X802	F-1
D5	A-1	D706	E-5	D912	C-4	IC104	B-2	IC502	E-3	IC804	G-2	L911	C-5	*Q111	C-3	*Q214	A-3	*Q710	A-5	Q917	C-4	*S7	D-2	TP101	B-2		

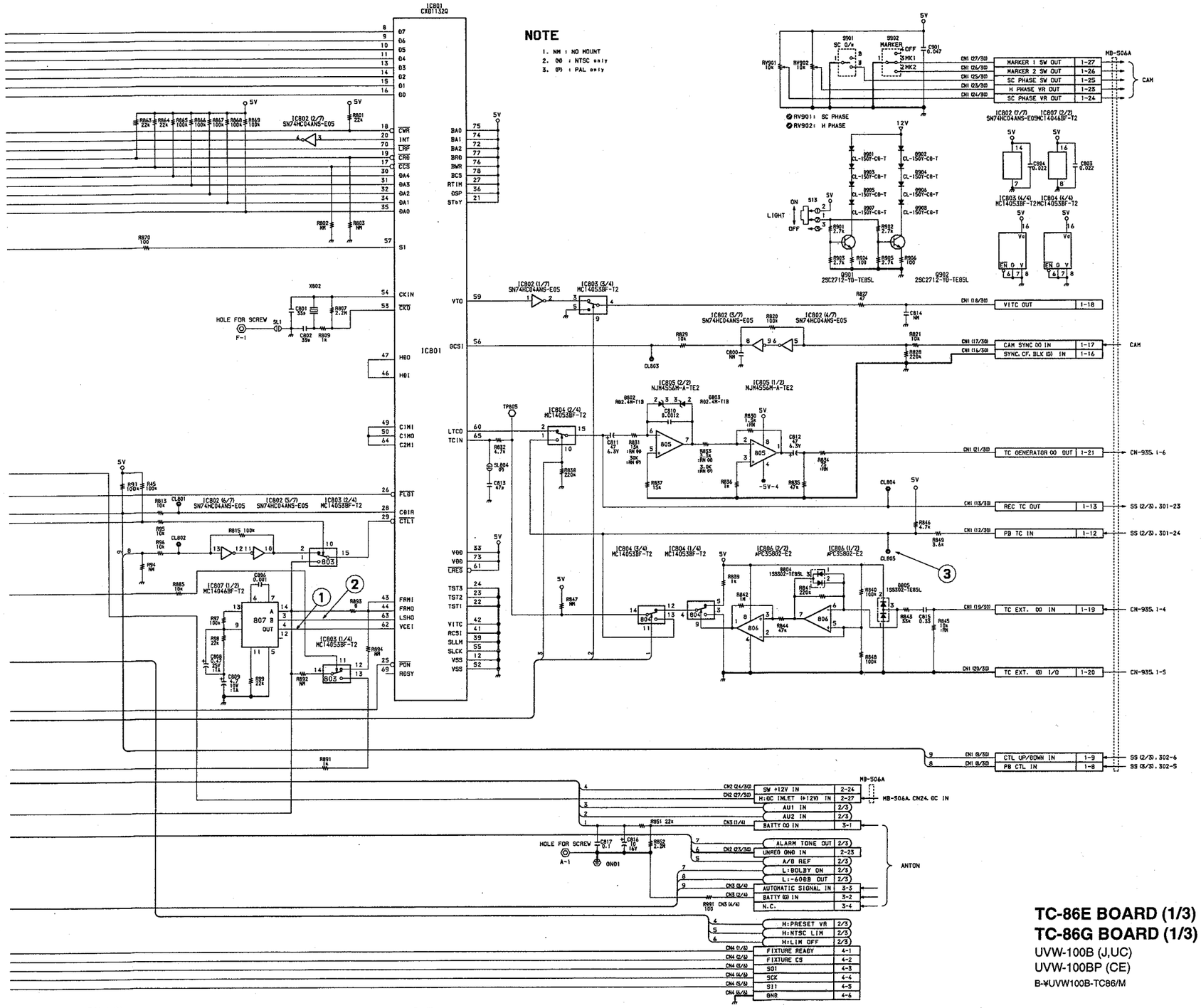
UVW-100B(J, UC)
UVW-100BP(CE)

TC-86E / 86G (1/3)

TC GENERATOR AUDIO AMP



TC-86E / 86G (1/3)

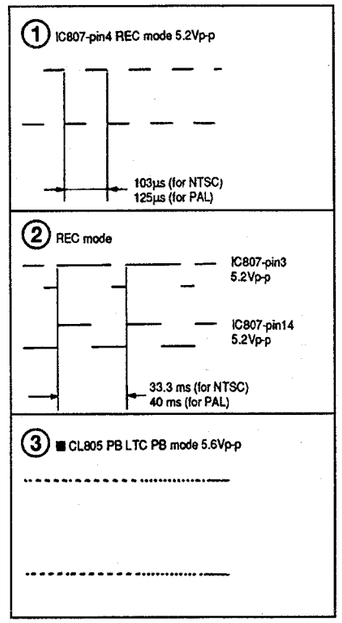


TC-86E BOARD (1/3)
TC-86G BOARD (1/3)
UVW-100B (J,UC)
UVW-100BP (CE)
B-¥UVW100B-TC86/M

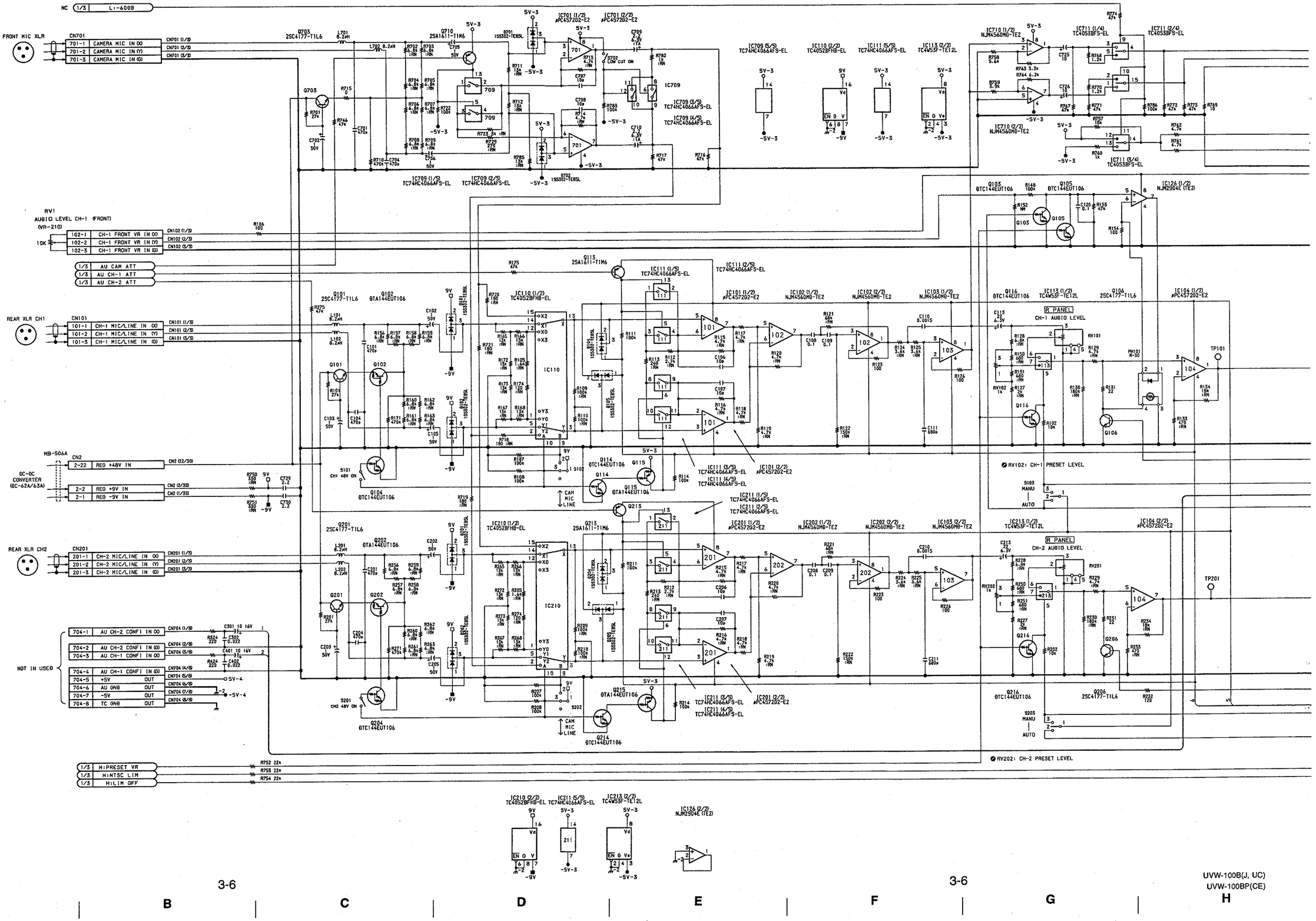
UVW-100B(J, UC)
UVW-100BP(CE)

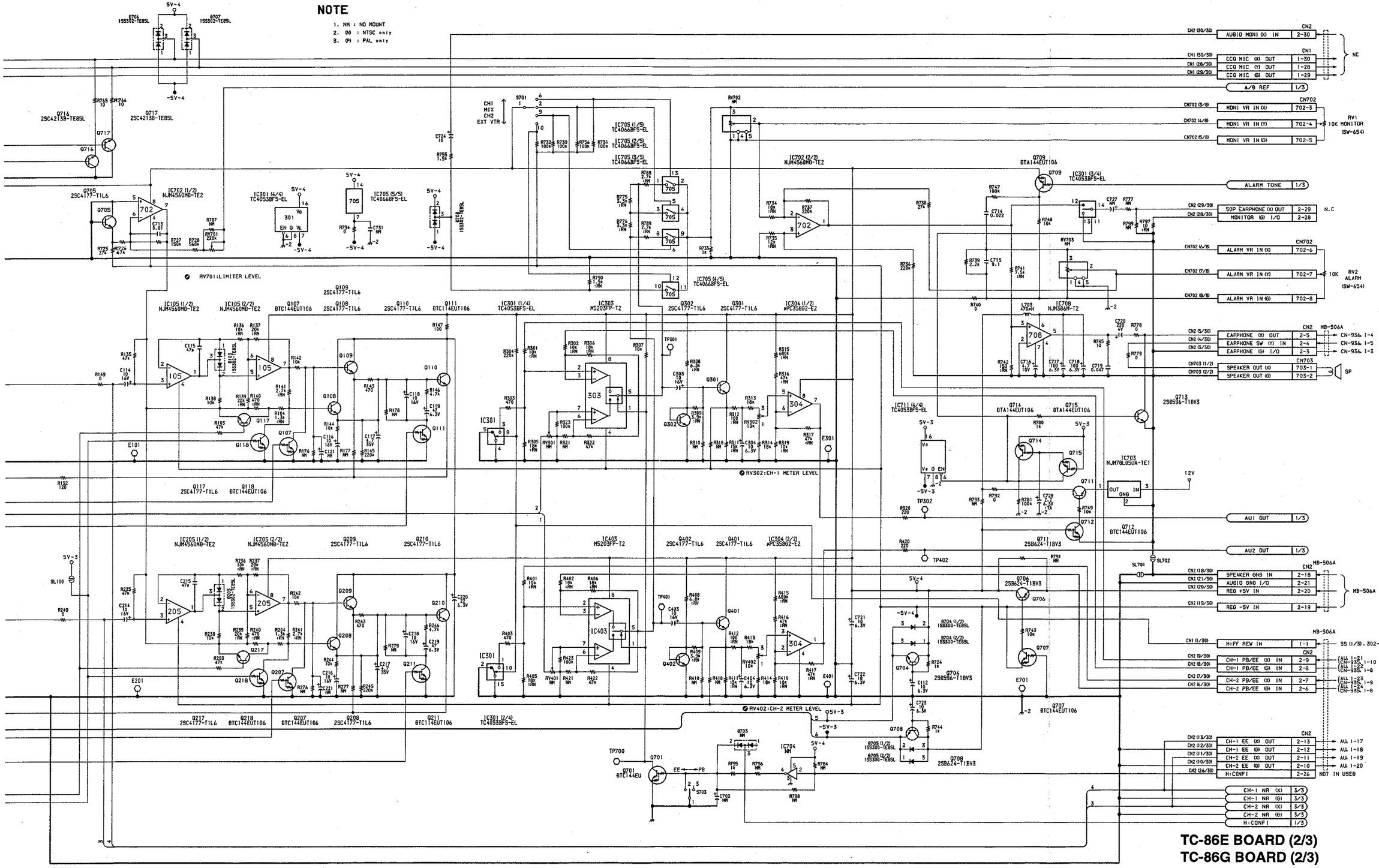
TC GENERATOR AUDIO AMP

REC モード ..... 75% COLOR BARSの記録状態。
PB モード ..... アライメントテープCR5-1BのCOLOR BARS部分の再生状態。
REC mode ..... Record the 75% color bars signal.
PB mode ..... Play back the color bars signal portion of the alignment tape CR5-1B (for NTSC) / CR5-1BPS (for PAL).



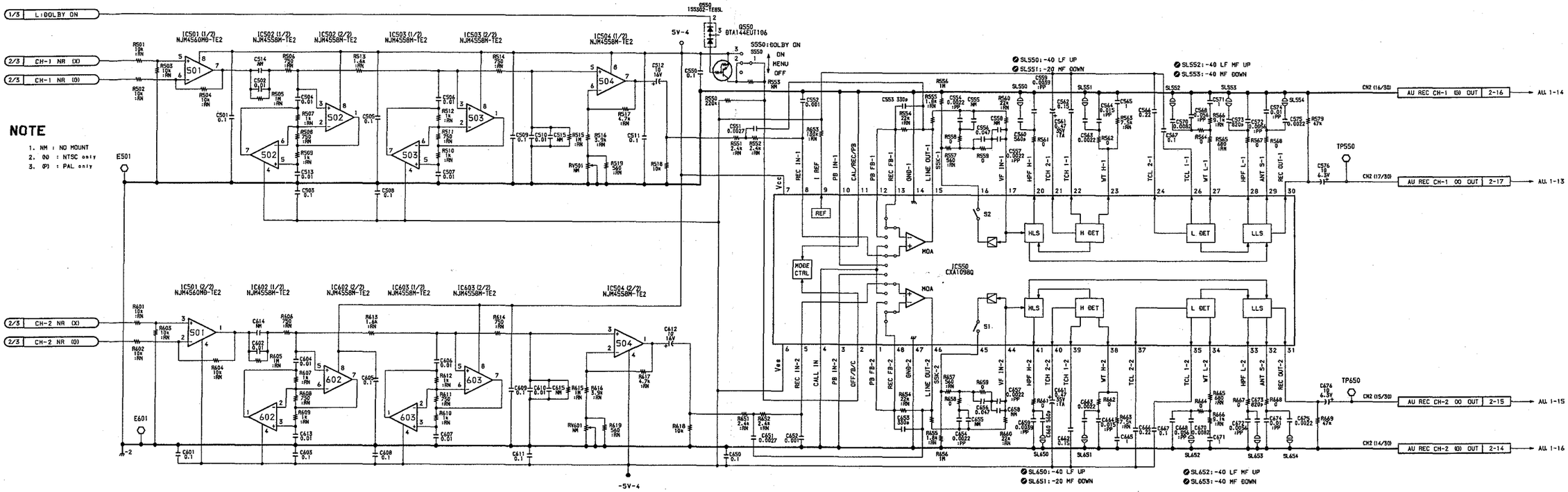
TC GENERATOR AUDIO AMP





TC-86E BOARD (2/3)
TC-86G BOARD (2/3)
UVW-100B (J,UC)
UVW-100BP (CE)
B-¥UVW100B-TC86/M

TC GENERATOR AUDIO AMP

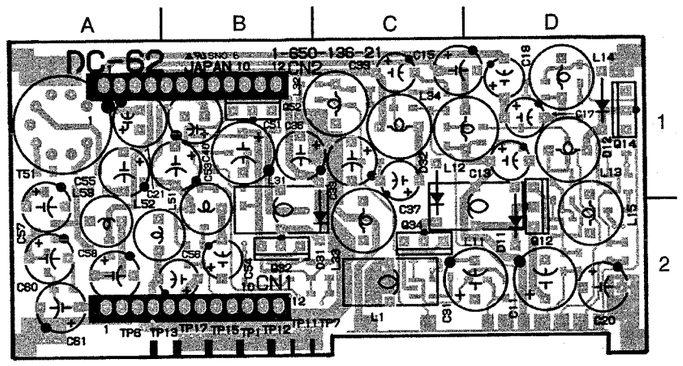


TC-86E BOARD (3/3)
TC-86G BOARD (3/3)
UVW-100B (J,UC)
UVW-100BP (CE)
B-¥UVW100B-TC86/M

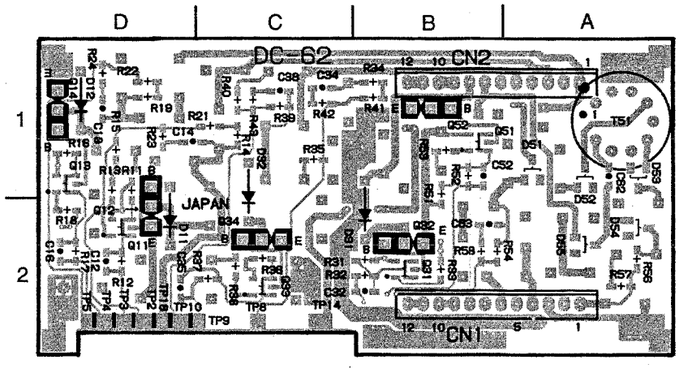
DC-62A (1-650-136-21)

* : B SIDE

* CN1	A-2	L32	C-1
* CN2	A-1	L33	C-2
		L34	C-1
D11	D-2	L51	B-2
D12	D-1	L52	A-2
D31	B-2	L53	A-2
D32	C-1		
* D51	A-1	* Q11	D-2
* D52	A-1	Q12	D-2
* D53	A-1	* Q13	D-1
* D54	A-2	Q14	D-1
* D55	A-2	* Q31	B-2
		Q32	B-2
L1	C-2	* Q33	C-2
L11	C-2	Q34	C-2
L12	C-1	* Q51	B-1
L13	D-1	Q52	B-1
L14	D-1		
L15	D-2	T51	A-1
L31	B-2		



DC-62A -A side-
1-650-136-21
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)

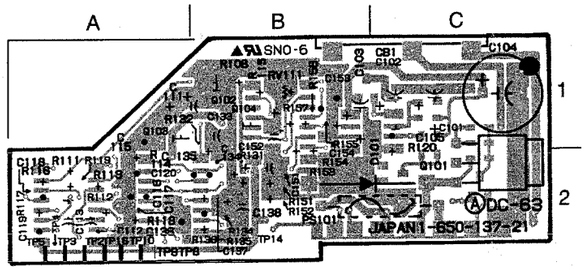


DC-62A -B side-
1-650-136-21
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)

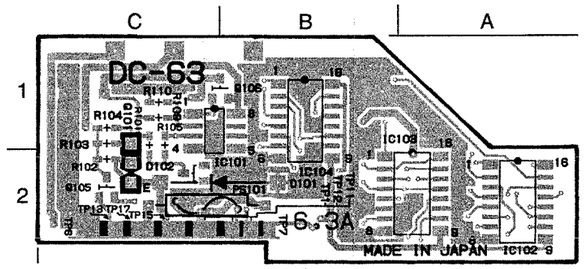
DC-63A (1-650-137-21)

* : B SIDE

CB1	C-1		
D101	B-2		
* D102	C-2		
* IC101	C-1		
* IC102	A-2		
* IC103	A-2		
* IC104	B-1		
* PS101	C-2		
Q101	C-2		
Q102	B-1		
Q103	A-1		
Q104	B-1		
* Q105	C-2		
* Q106	B-1		
RV111	B-1		

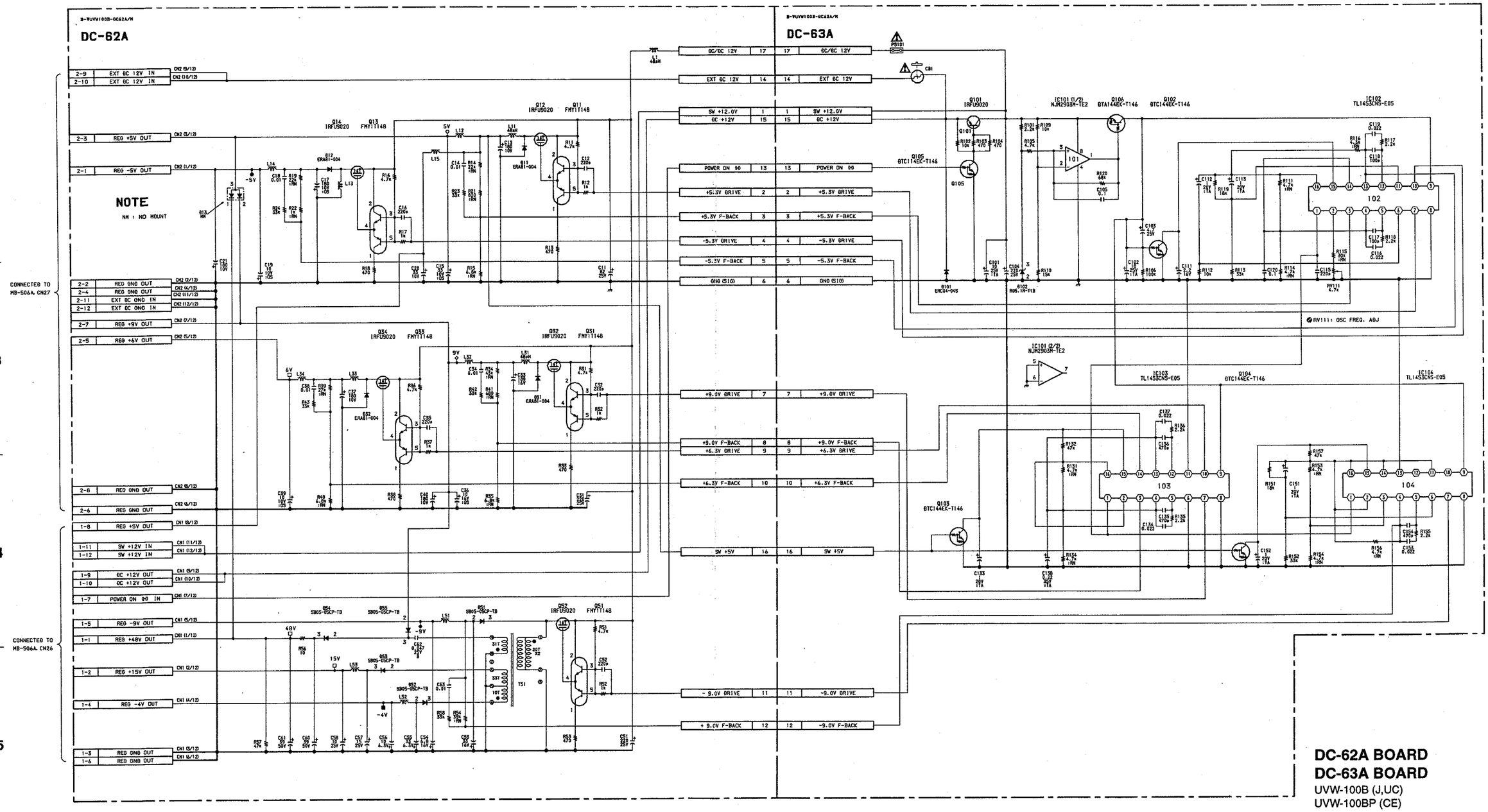


DC-63A -A side-
1-650-137-21
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)

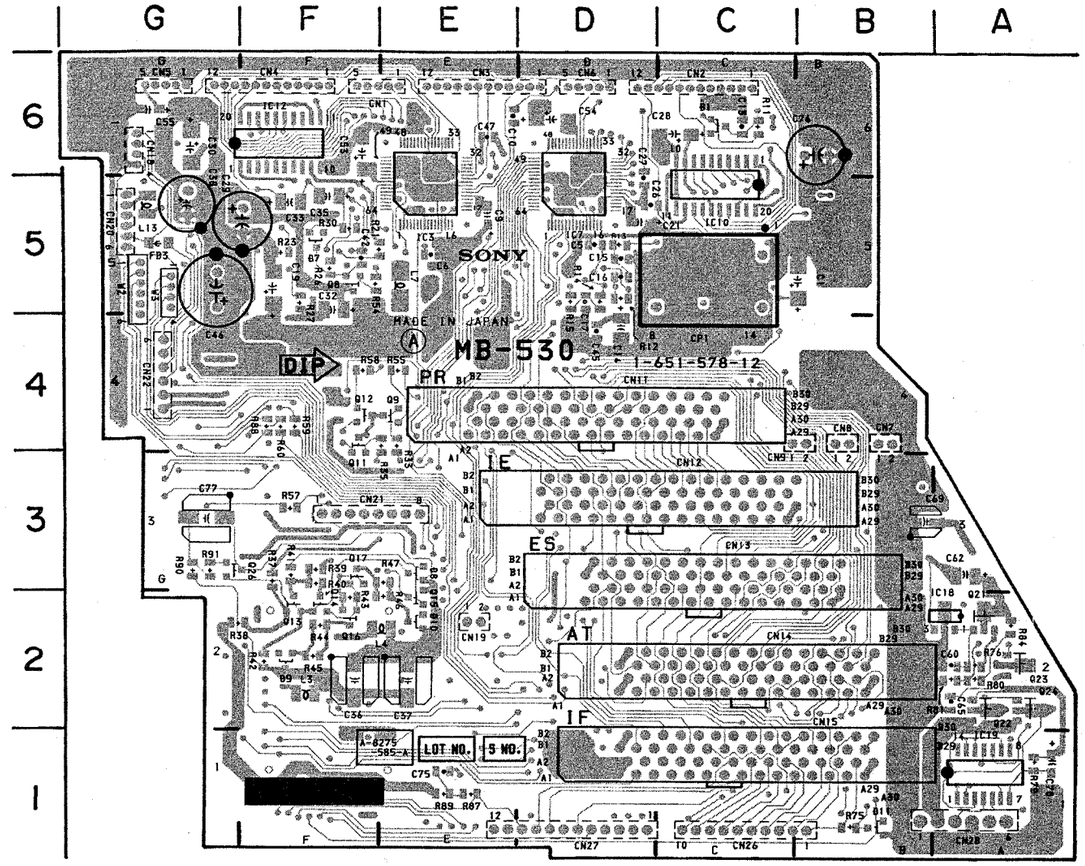


DC-63A -B side-
1-650-137-21
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)

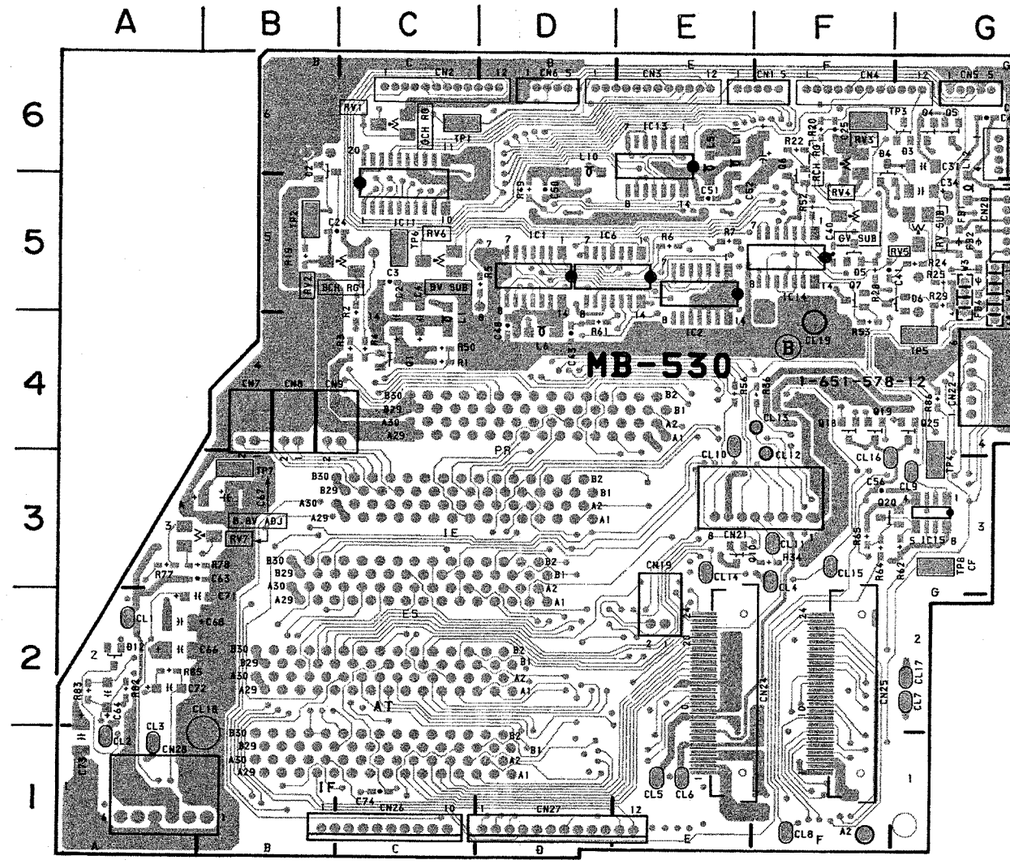
DC - DC CONVERTER



DC-62A BOARD
DC-63A BOARD
UVW-100B (J,UC)
UVW-100BP (CE)
A-¥UVW100B-DC62A/63A/M
B-¥UVW100B-DC62A/M
B-¥UVW100B-DC63A/M



MB-530D (N) / 530D (P) -A side-
1-651-578-12
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)



MB-530D (N) / 530D (P) -B side-
1-651-578-12
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)

MB-530D(N)/530D(P) (1-651-578-12)

* : B SIDE

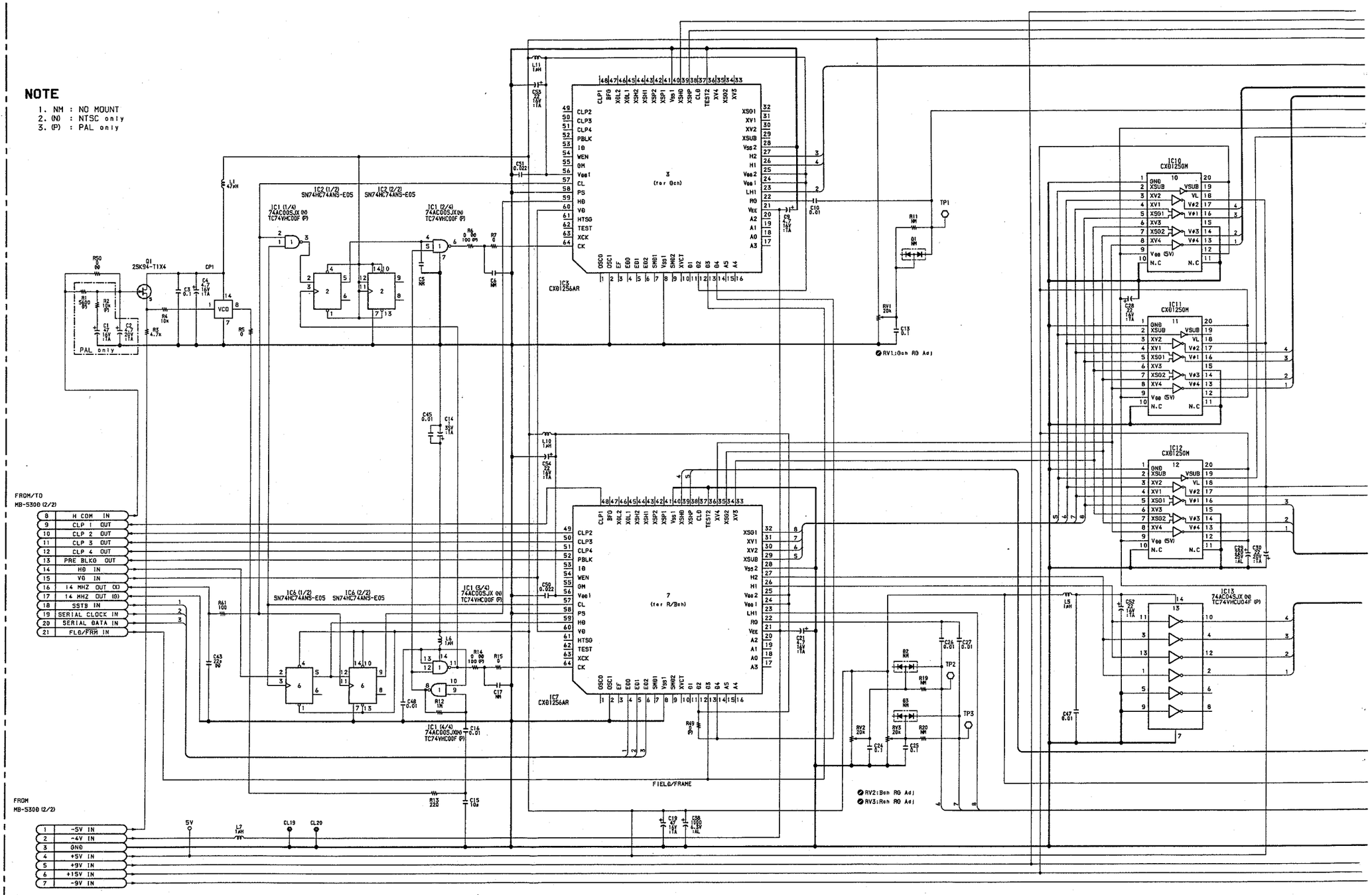
* CN1	F-6	CN13	C-3	* CN27	D-1	D10	E-2	* IC1	D-5	IC18	A-2	* L12	G-6	Q11	F-3	Q22	A-2	* RV7	B-3	W2	G-5
* CN2	C-6	CN14	C-2	* CN28	A-1	D11	B-1	* IC2	E-4	IC19	A-1	L13	G-5	Q12	F-4	Q23	A-2			W3	G-5
* CN3	E-6	CN15	B-2			* D12	A-2	IC3	E-5					Q13	F-2	Q24	A-2	* TP1	C-6		
* CN4	F-6	* CN18	G-6	CP1	C-4			* IC6	D-5	* L1	C-4	* Q1	C-4	Q14	F-2	* Q25	G-4	* TP2	B-5		
* CN5	G-6	* CN19	E-3			* E1	G-6	IC7	D-5	L3	F-2	* Q4	G-6	Q15	E-2			* TP3	G-6		
* CN6	D-6	* CN20	G-5	* D4	F-6			IC10	C-5	L4	E-2	* Q5	G-6	Q16	F-2	* RV1	C-6	* TP4	G-3		
* CN7	B-4	* CN21	E-3	* D5	F-5	* FB1	G-5	* IC11	C-5	* L5	E-6	* Q6	F-6	Q17	F-3	* RV2	B-5	* TP5	G-4		
* CN8	B-4	* CN22	G-4	* D6	G-5	* FB2	G-5	IC12	F-6	* L6	D-4	* Q7	F-5	* Q18	F-4	* RV3	F-6	* TP6	C-5		
* CN9	B-4	* CN24	F-2	D7	F-5	FB3	G-5	* IC13	E-6	L7	E-5	Q8	F-5	* Q19	F-4	* RV4	F-5	* TP7	B-3		
CN11	D-4	* CN25	F-2	D8	E-3	* FB4	G-5	* IC14	F-5	* L10	D-6	Q9	E-4	* Q20	F-3	* RV5	G-5	* TP8	G-3		
CN12	C-3	* CN26	C-1	D9	F-2			* IC15	G-3	* L11	E-6	* Q10	E-3	Q21	A-2	* RV6	C-5				

B-VUVW100B-KB530/M

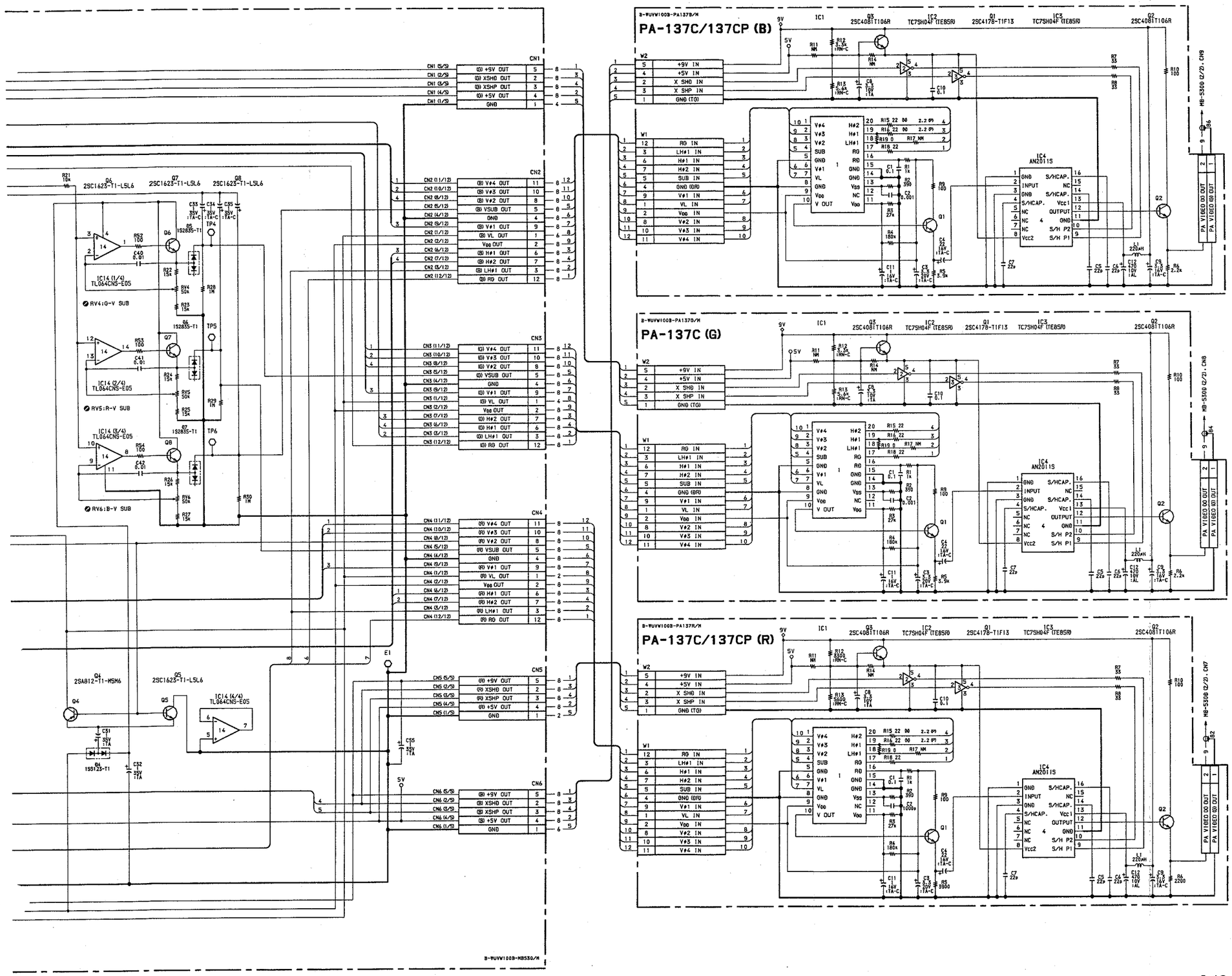
MB-530D (N) (1/2)
MB-530D (P) (1/2)

NOTE

1. NM : NO MOUNT
2. (N) : NTSC only
3. (P) : PAL only



CAMERA FRAME (1/2)



CAMERA FRAME (1/2)
MB-530D (N) / 530D (P) BOARD (1/2)
PA-137C / 137CP (R) BOARD
PA-137C (G) BOARD
PA-137C / 137CP (B) BOARD
UVW-100B (J,UC)
UVW-100BP (CE)
A-¥UVW100B-FRAME/M#1
B-¥UVW100B-MB530/M
B-¥UVW100B-PA137G/M
B-¥UVW100B-PA137R/M
B-¥UVW100B-PA137B/M

CAMERA FRAME (2/2)

B-9UVV100B-MB530/M

MB-530D (N) (2/2)
MB-530D (P) (2/2)

CN7 CN8 CN9 — MB-5300 (1/2) / PA-157A W3

CN101 LENS (FEMALE) -EXTERNAL SIDE-

CN102 LENS -EXTERNAL SIDE-

CN103 -EXTERNAL SIDE- VF

CN104 VIDEO OUT

S191 WHT/BLK

CN20 LENS

CN22 OPTION

CN21 VF

CN19 VBS

CN18 SW3

SW2 W3

SW1 W2

CN28

CONNECTED TO MB-506A CN29

FROM/TO MB-5300 (1/2)

CN1 PR

CN12 IE

CN13 ES

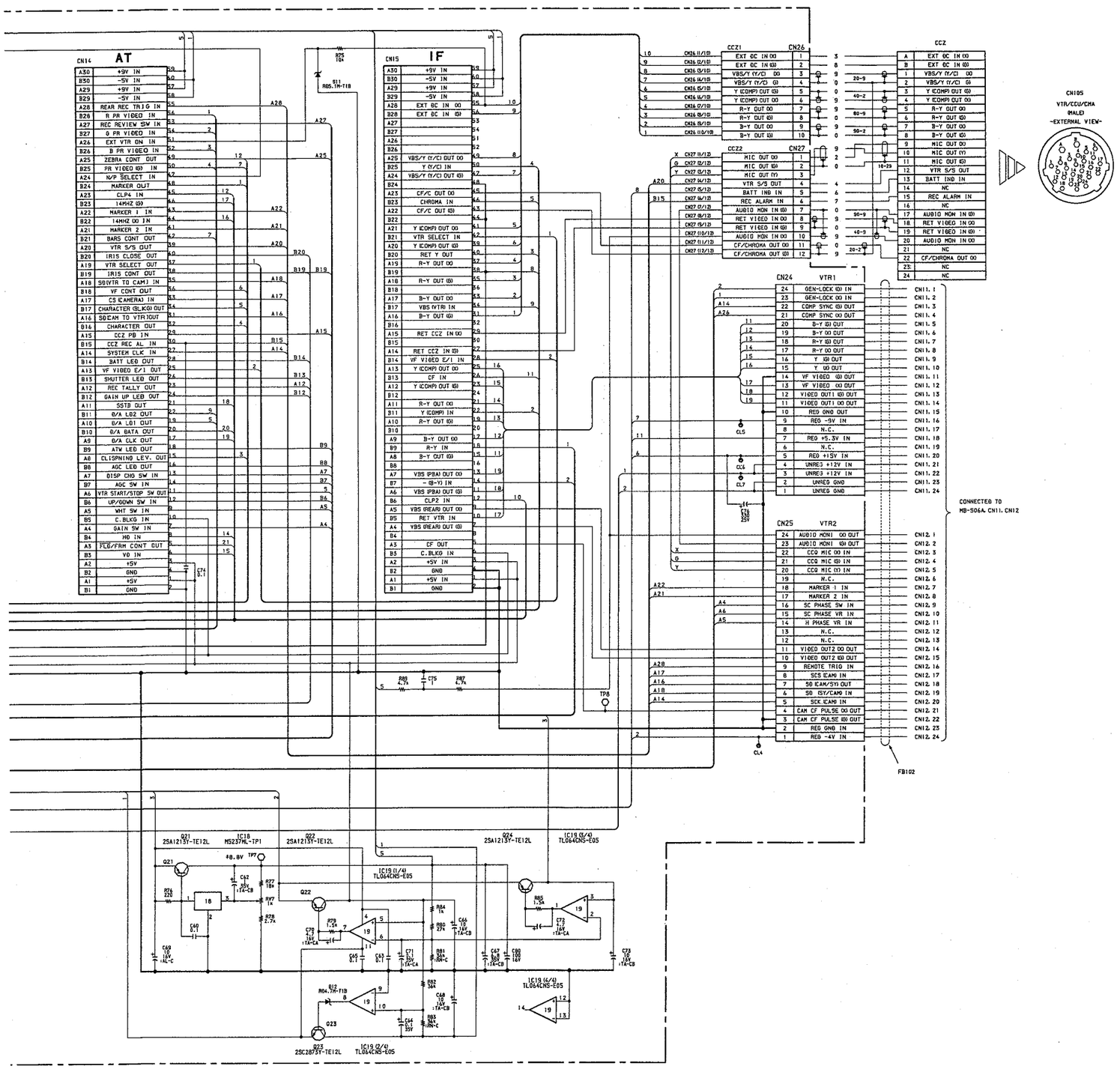
SW-656 B-9UVV100-SW656/M

SW-655 B-9UVV100-SW655/M

SW-654 B-9UVV100B-SW654/M

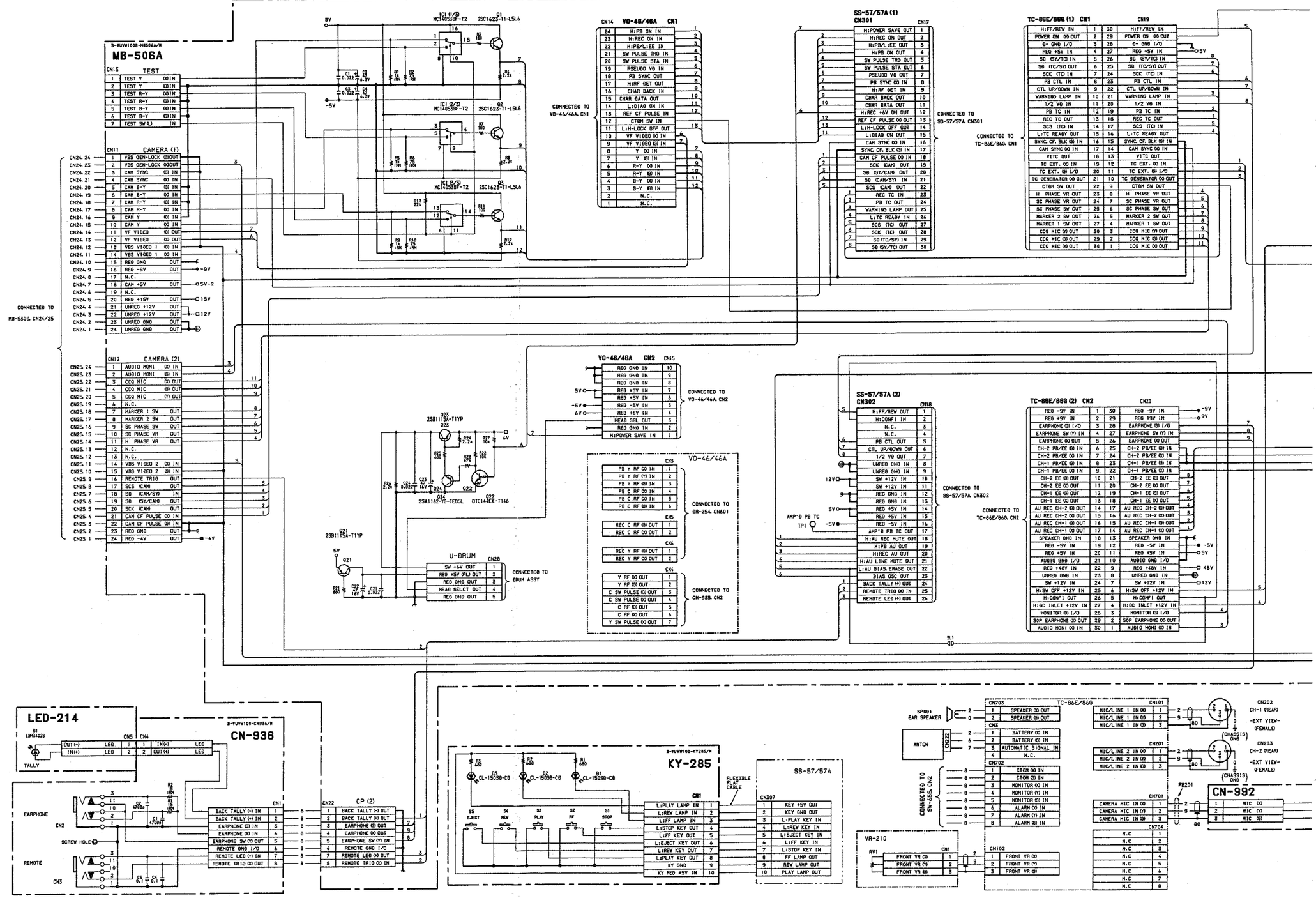
TO: TC-86E/86G

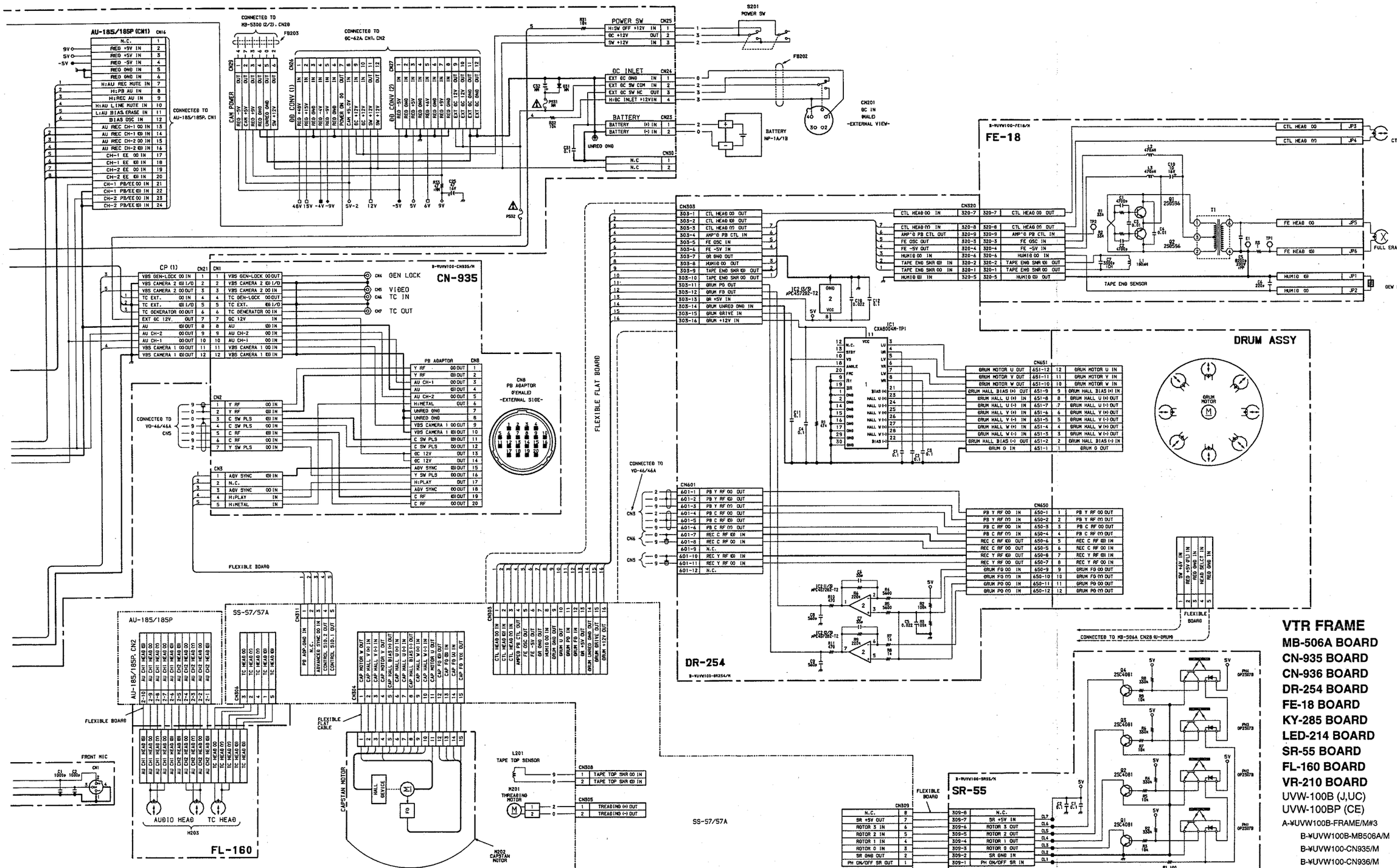
CAMERA FRAME (2/2)

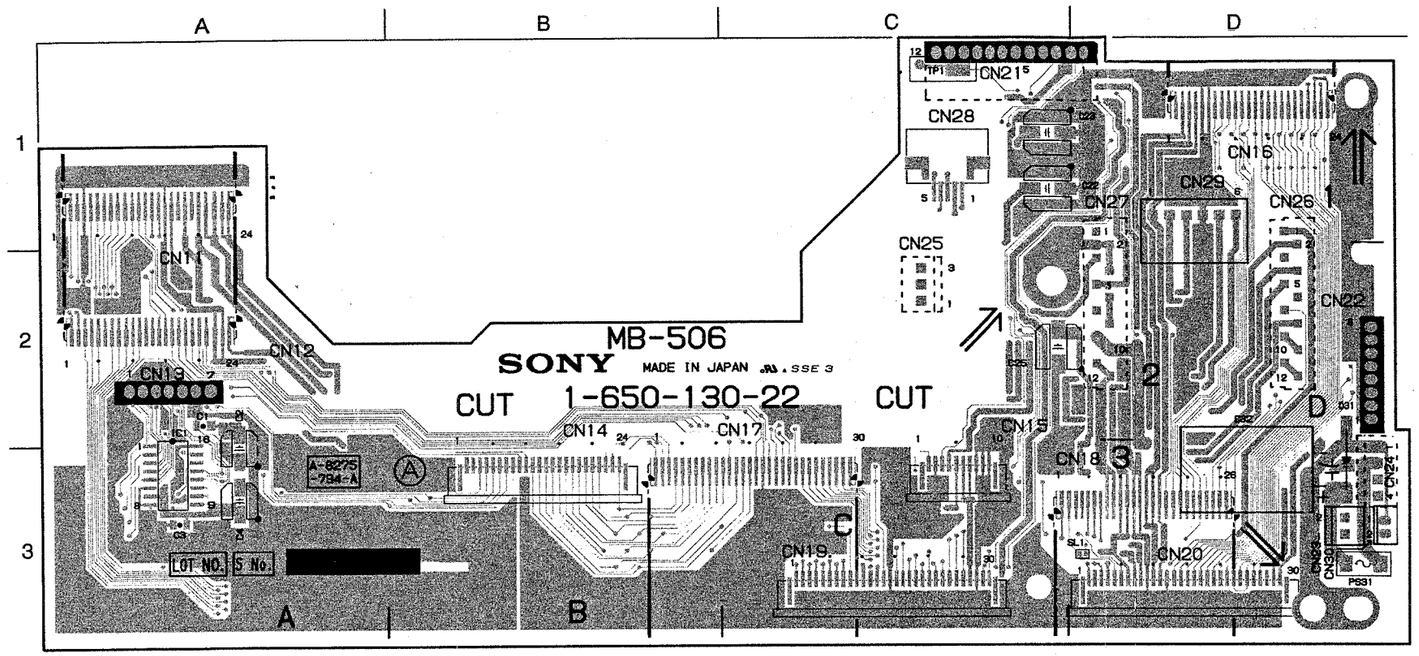


CAMERA FRAME (2/2)
MB-530D (N) / 530D (P) BOARD (2/2)
SW-654 BOARD
SW-655 BOARD
SW-656 BOARD
UVW-100B (J,UC)
UVW-100BP (CE)
A-¥UVW100B-FRAME/M#2
B-¥UVW100B-MB530/M
B-¥UVW100B-SW654/M
B-¥UVW100-SW655/M
B-¥UVW100-SW656/M

VTR FRAME


MB-506A
CN13 TEST
CN11 CAMERA (1)
CN12 CAMERA (2)
CONNECTED TO MB-550D CN24/25
IC1 (1/2) MC14053BF-T2
IC1 (2/2) MC14053BF-T2
IC1 (3/2) MC14053BF-T2
2SC1623-T1-L5L6
Q1
Q2
Q3
CONNECTED TO VO-46/46A CN1
VO-46/46A CN1
CN14
SS-57/57A (1) CN301
CN17
CONNECTED TO SS-57/57A CN301
TC-88E/88G (1) CN1
CN19
CONNECTED TO TC-88E/86G CN1
VO-46/46A CN2
CN15
CONNECTED TO VO-46/46A CN2
Q23
2SB1115A-T1YP
Q22
DTC144EK-T146
Q24
2SA1162-T0-1E8SL
Q21
U-DRUM
CN28
CONNECTED TO DRUM ASSY
SS-57/57A (2) CN302
CN18
CONNECTED TO SS-57/57A CN302
TC-88E/88G (2) CN2
CN20
CONNECTED TO TC-88E/86G CN2
AMP'D PB TC
TP1
LED-214
CN-936
CN5
CN4
TALLY
EARPHONE
REMOTE
CN2
CN3
SCREW HOLE
CN1
CN22 CP (2)
KY-285
CL-150S6-C8
S5 EJECT
S4 REV
S3 PLAY
S2 FF
S1 STOP
FLEXIBLE FLAT CABLE
SS-57/57A
CN307
CONNECTED TO SW-655 CN2
VR-210
CN102
SP001 EAR SPEAKER
AMTON
CN222
CN703
CN5
CN702
CN101
CN201
CN701
CN704
CN202 CH-1 REAR -EXT VIEW- (FEMALE)
CN203 CH-2 REAR -EXT VIEW- (FEMALE)
CN-992
FB201
(CHASSIS) GND


AU-185/185P (CN1) CN16
CONNECTED TO AU-185/185P. CN1
CONNECTED TO MB-5308 (2/2). CN28
FB203
CONNECTED TO DC-62A CN1, CN2
CAM POWER CN29
BD CONV (1) CN26
BD CONV (2) CN27
POWER SW CN25
S201 POWER SW
DC INLET CN24
FB202
CN201 DC IN 9MALD -EXTERNAL VIEW-
BATTERY CN23
BATTERY NP-1A/1B
CN30
CP (1) CN21 CN1
CN-935
GEN LOCK
VIDEO
TC IN
TC OUT
PB ADAPTOR CN8
CN8 PB ADAPTOR (FEMALE) -EXTERNAL SIDE-
CONNECTED TO VD-46/46A CN5
CN2
CN3
FLEXIBLE BOARD
FLEXIBLE FLAT BOARD
CONNECTED TO VD-46/46A
CN601
CN650
CN651
DR-254
DRUM ASSY
DRUM MOTOR
FE-18
TAPE END SENSOR
H201 CTL HEAD
H202 FULL ERASE HEAD
CS201 REV SENSOR
AU-185/185P
SS-57/57A
AUDIO HEAD
TC HEAD
H203
FL-160
FRONT MIC
FLEXIBLE FLAT CABLE
CAPSTAN MOTOR
HALL DEVICE
FG
L201 TAPE TOP SENSOR
M201 THREADING MOTOR
H202 CAPSTAN MOTOR
SR-55
CONNECTED TO MB-506A CN28 4U-DRUM
VTR FRAME
MB-506A BOARD
CN-935 BOARD
CN-936 BOARD
DR-254 BOARD
FE-18 BOARD
KY-285 BOARD
LED-214 BOARD
SR-55 BOARD
FL-160 BOARD
VR-210 BOARD
UVW-100B (J,UC)
UVW-100BP (CE)
A-¥UVW100B-FRAME/M#3
B-¥UVW100B-MB506A/M
B-¥UVW100-CN935/M
B-¥UVW100-CN936/M
B-¥UVW100-DR254/M
B-¥UVW100-FE18/M
B-¥UVW100-KY285/M
B-¥UVW100-SR55/M

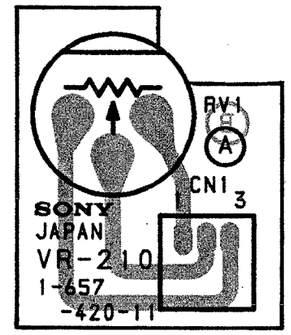


MB-506A (1-650-130-22)

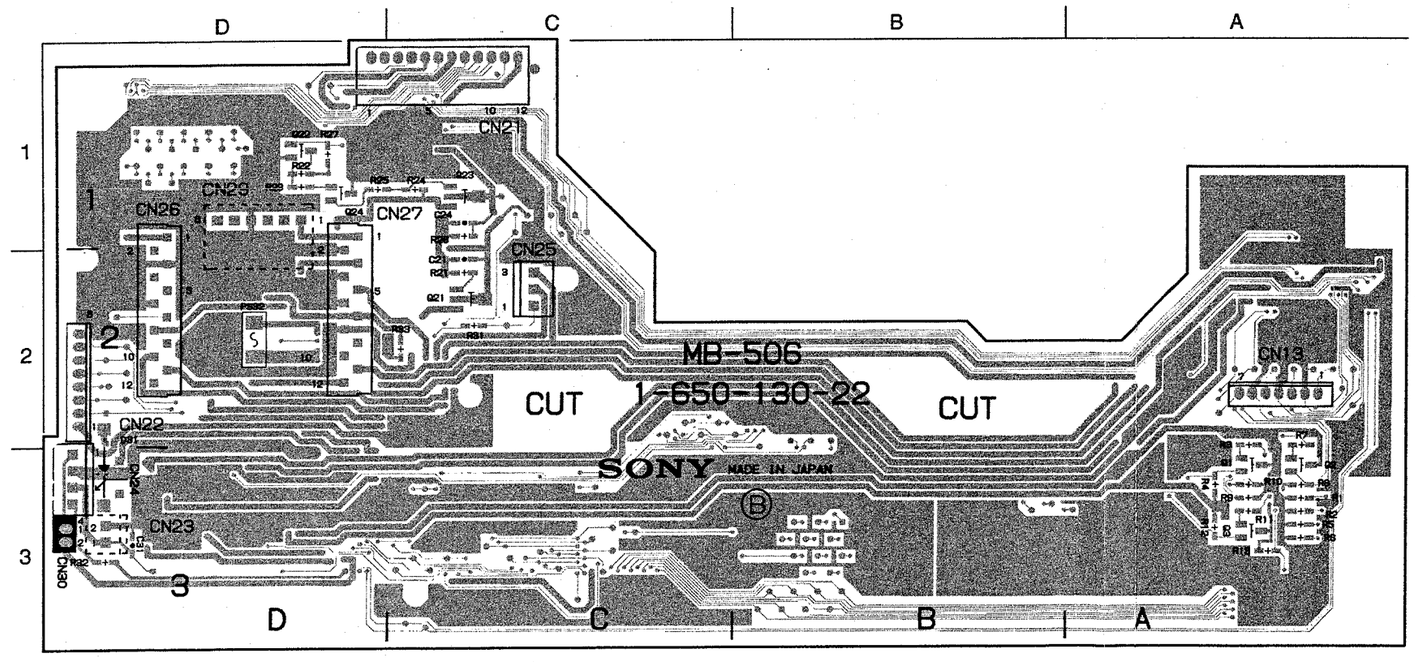
* : B SIDE

CN11	A-1	CN28	C-1
CN12	A-2	CN29	D-1
*CN13	A-2	CN30	D-3
CN14	B-3		
CN15	C-3	IC1	A-3
CN16	D-1		
CN17	C-3	*PS32	D-2
CN18	D-3		
CN19	C-3	*Q1	A-3
CN20	D-3	*Q2	A-3
*CN21	D-1	*Q3	A-3
*CN22	D-2	*Q21	C-2
CN23	D-3	*Q22	D-1
*CN24	D-3	*Q23	C-1
*CN25	C-2	*Q24	D-1
*CN26	D-1		
*CN27	D-1	TP1	C-1

MB-506A **-A side-**
1-650-130-22
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)



VR-210 **-A side-**
1-657-420-11
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)



MB-506A **-B side-**
1-650-130-22
UVW-100B (J)
UVW-100B (UC)
UVW-100BP (CE)

SECTION 4
SPARE PARTS AND OPTIONAL FIXTURES

4-1. EXPLODED VIEW

NOTE: The different parts between UVW-100 and UVW-100B or UVW-100P and UVW-100BP are indicated by broken line or "➡ " mark.

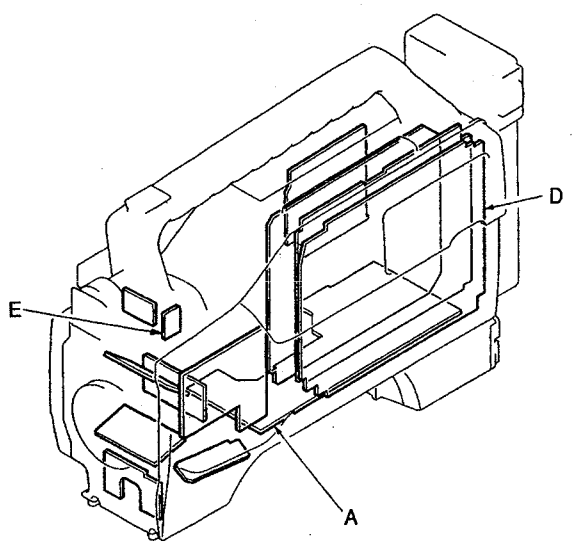
BOARD DIFFERENCE

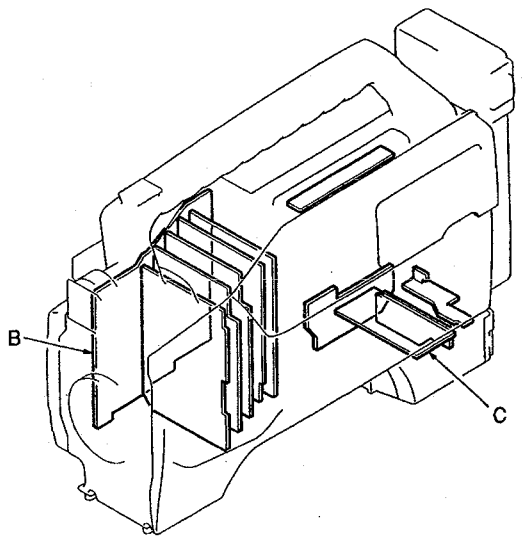
UVW-100, UVW-100P

No.	Part No.	SP	Description
A	A-8275-590-A	o	MOUNTED CIRCUIT BOARD, MB-506
B	A-8275-585-A	o	MOUNTED CIRCUIT BOARD, MB-530 (J,UC)
	A-8275-691-A	o	MOUNDED CIRCUIT BOARD, MB-530 (P) (EK)
C	A-8275-588-A	o	MOUNTED CIRCUIT BOARD, DC-62
D	A-8275-586-A	o	MOUNTED CIRCUIT BOARD, TC-86 (J,UC)
	A-8275-692-A	o	MOUNDED CIRCIUT BOARD, TC-86A (EK)

UVW-100B, UVW-100BP

No.	Part No.	SP	Description
A	A-8275-794-A	o	MOUNTED CIRCUIT BOARD, MB-506A
B	A-8273-364-A	o	MOUNTED CIRCUIT BOARD, MB-530D (N) (J,UC)
	A-8273-365-A	o	MOUNDED CIRCUIT BOARD, MB-530D (P) (EK)
C	A-8275-791-A	o	MOUNTED CIRCUIT BOARD, DC-62A
D	A-8273-409-A	o	MOUNTED CIRCUIT BOARD, TC-86E (J,UC)
	A-8273-393-A	o	MOUNDED CIRCIUT BOARD, TC-86G (EK)
E	1-657-420-11	o	PRINTED CIRCUIT BOARD, VR-210





FRONT PANEL

Service manual(UVW-100/100P.....page 13-2)

UVW-100, UVW-100P

No.	Part No.	SP	Description	
1	A-8276-985-A	s	CCD UNIT-W100 (N)	(J,UC) *1
2	A-8276-986-A	s	CCD UNIT-W100P (P)	(EK) *2

*1 CCD BLOCK No. CA A xxxxx
*2 CCD BLOCK No. CB A xxxxx

UVW-100B, UVW-100BP

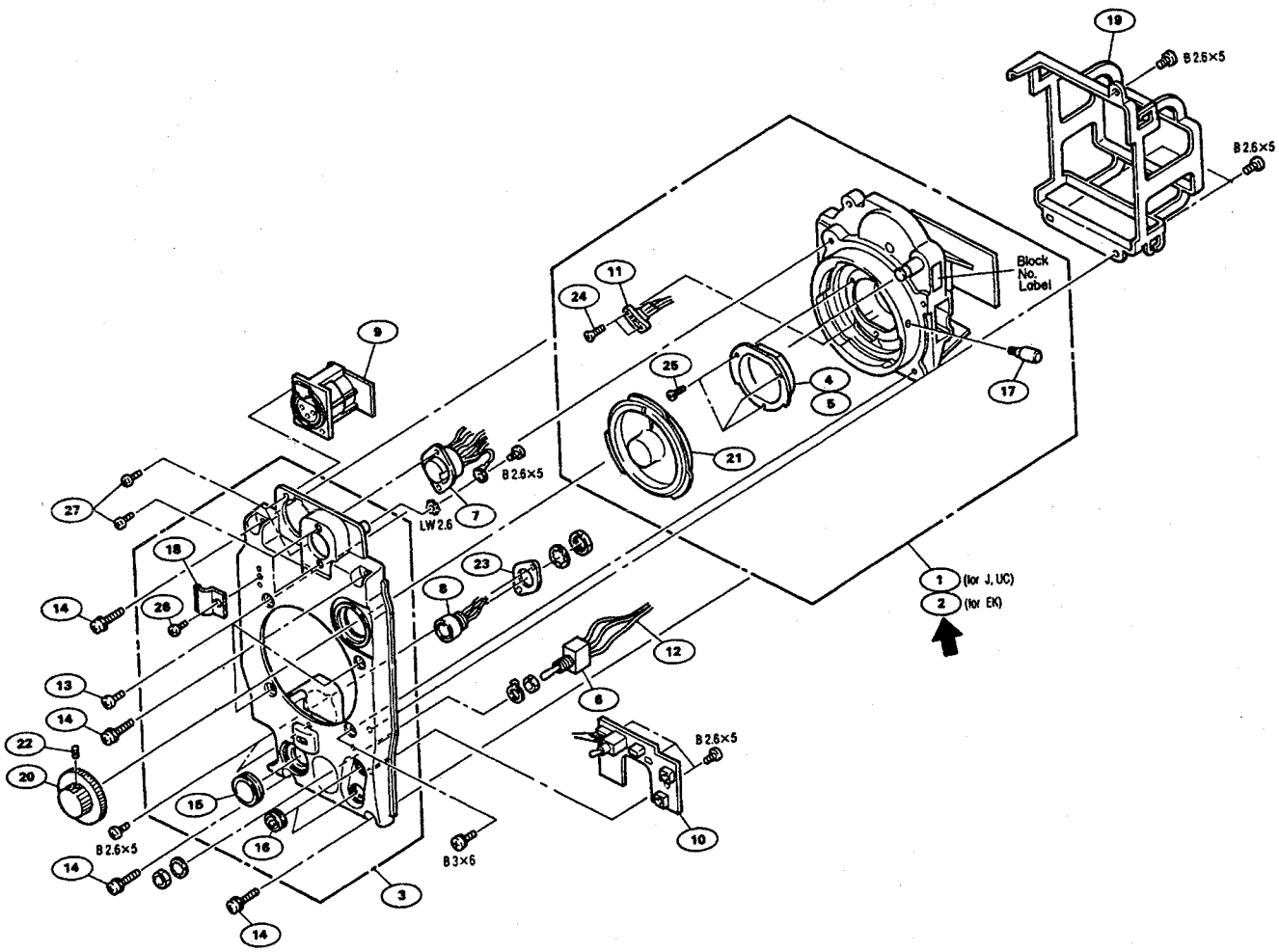
No.	Part No.	SP	Description	
1	A-8277-430-A	s	CCD UNIT-W100B (N)	(J,UC) *3
2	A-8277-431-A	s	CCD UNIT-W100BP (P)	(EK) *4

*3 CCD BLOCK No. CO A xxxxx
*4 CCD BLOCK No. CP A xxxxx

< How to read the CCD BLOCK No. >

C A A xxxxx

- Block number of CCD unit
- Suffix of Spare part number
- Model name (A:UVW-100, B:UVW-100P, O:UVW-100B, P:UVW-100BP)
- CCD type

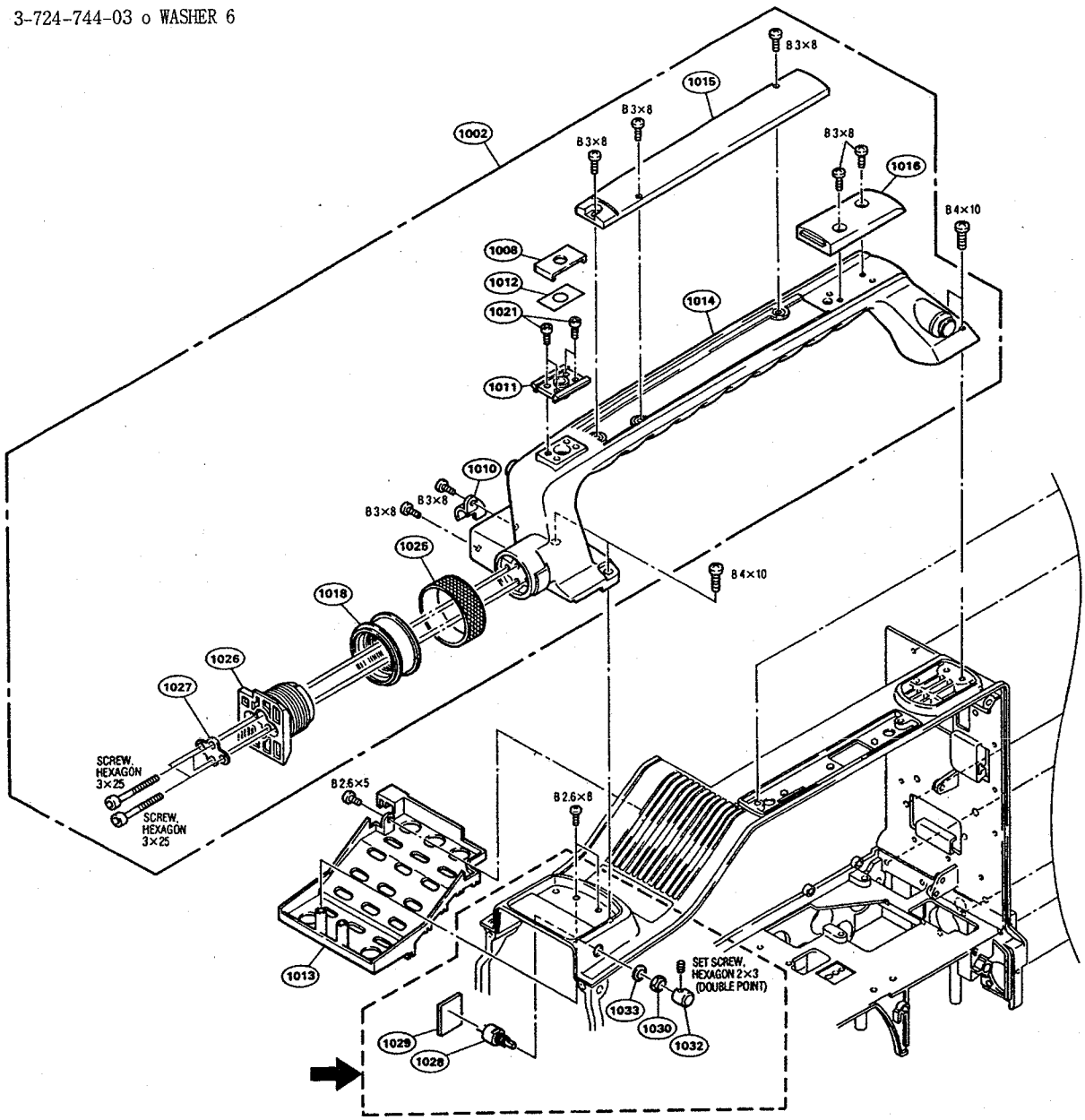


TOP FRAME / REAR FRAME

Service manual(UVW-100/100P.....page 13-22)

UVW-100B, UVW-100BP

No.	Part No.	SP	Description
1028	1-238-296-11	s	RES, VAR, CARBON 10K
1029	1-657-420-11	o	PRINTED CIRCUIT BOARD, VR-210
1030	3-685-104-01	s	NUT (M6) , CONTROL
1032	3-722-486-02	s	KNOB
1033	3-724-744-03	o	WASHER 6



PRINTED CIRCUIT BOARD

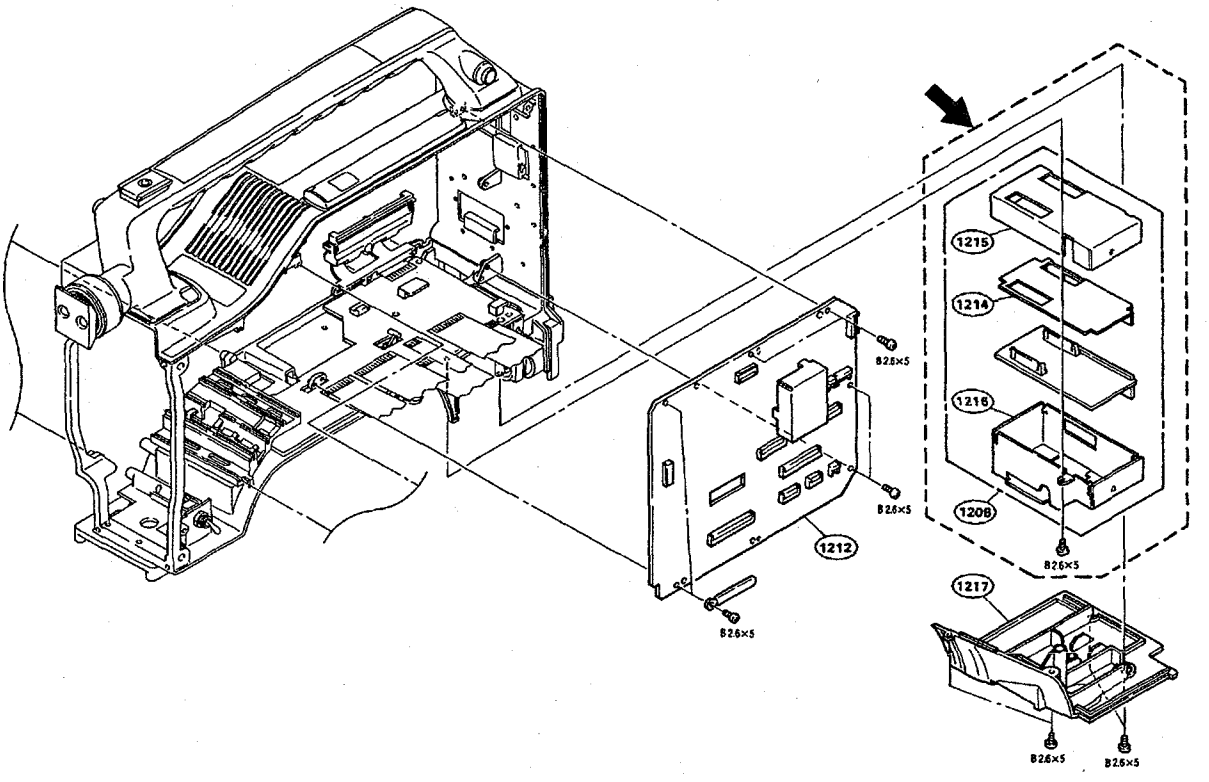
Service manual(UVW-100/100P.....page 13-26)

UVW-100, UVW-100P

No.	Part No.	SP	Description
1208	A-8275-588-A	o	MOUNTED CIRCUIT BOARD, DC-62
1216	3-679-074-02	o	CASE, SHIELD (B)

UVW-100B, UVW-100BP

No.	Part No.	SP	Description
1208	A-8275-791-A	o	MOUNTED CIRCUIT BOARD, DC-62A
1216	3-687-168-02	o	CASE, SHIELD (B)



LEFT SIDE PLATE

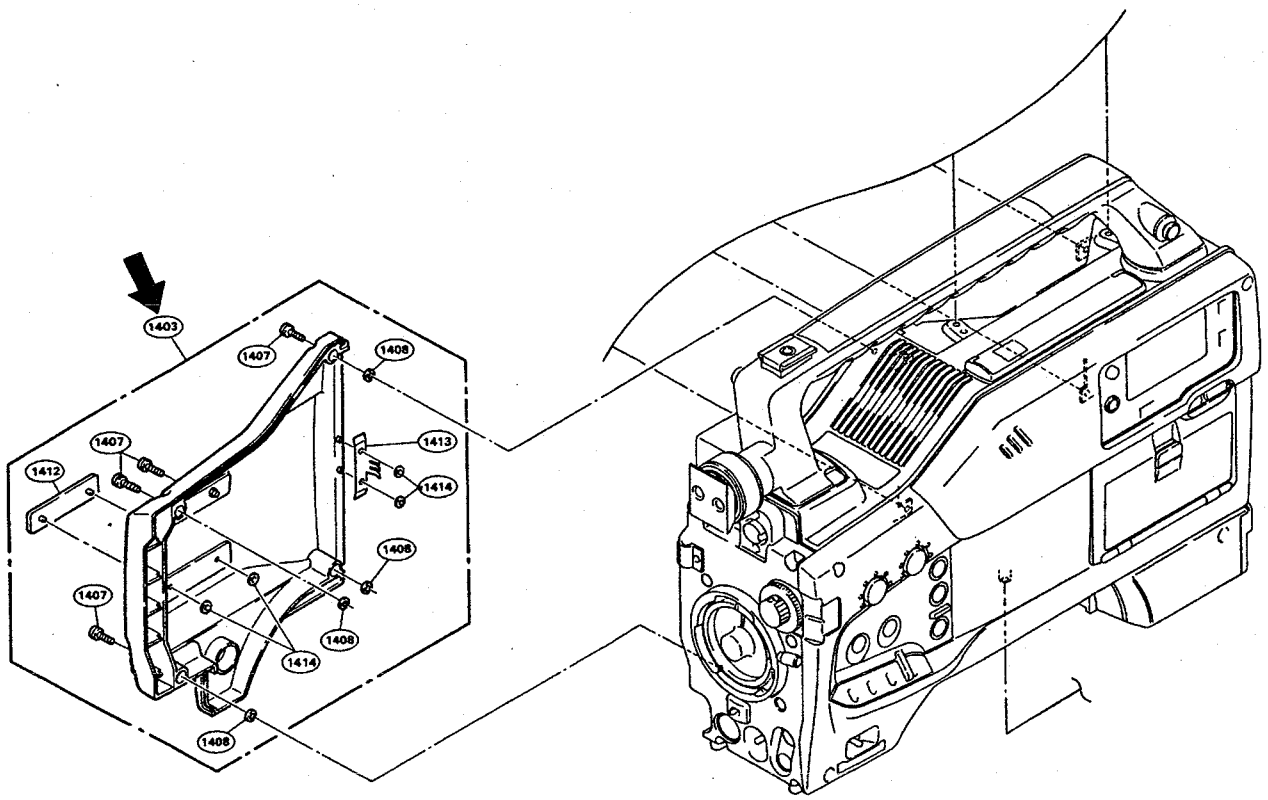
Service manual(UVW-100/100P.....page 13-30)

UVW-100, UVW-100P

No.	Part No.	SP	Description
1403	A-8278-008-E	o	PLATE ASSY, LEFT

UVW-100B, UVW-100BP

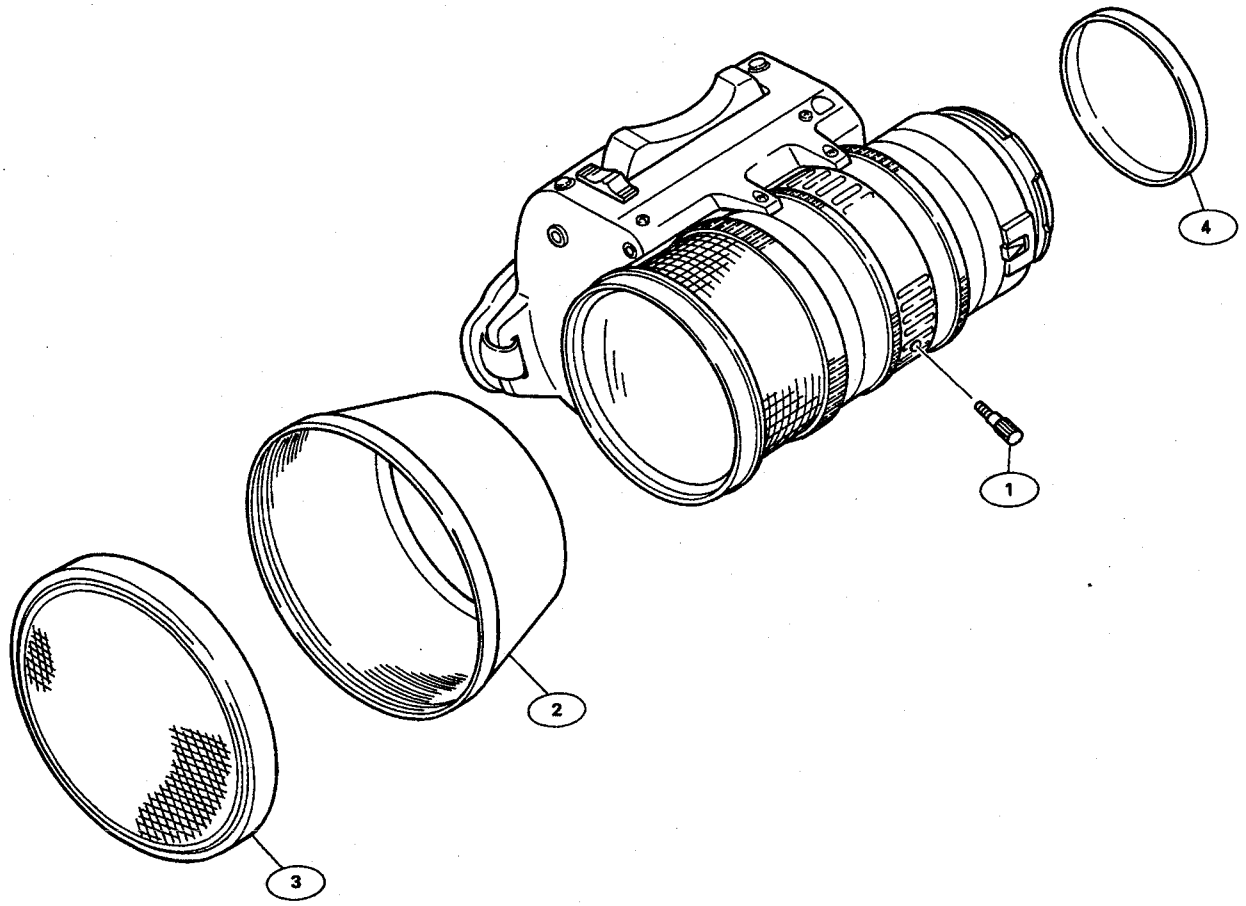
No.	Part No.	SP	Description
1403	A-8278-280-A	o	PLATE ASSY, LEFT



LENS (VCL-714BX)

Service manual(UVW-100/100P.....page 13-38)

No.	Part No.	SP	Description
1	3-707-247-01	o	LEVER, ZOOM
2	3-708-108-01	o	HOOD
3	3-708-109-01	o	CAP, HOOD
4	3-708-110-01	o	CAP, DUST



4-2. ELECTRICAL PARTS LIST

DC-62A BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8275-791-A	o	MOUNTED CIRCUIT BOARD, DC-62A
1pc	3-679-073-02	o	CASE, SHILD(U)
1pc	3-687-168-02	o	CASE, SHILD(B)
1pc	3-679-071-02	o	INSULATOR, DD CON
C11	1-111-056-11	s	ELECT 82uF 20% 25V
C12	1-163-125-00	s	CERAMIC, CHIP 220PF 5% 50V
C13	1-111-008-11	s	ELECT 180uF 20% 10V
C15	1-127-531-11	s	ELECT 20 16V
C16	1-163-125-00	s	CERAMIC, CHIP 220PF 5% 50V
C17	1-111-008-11	s	ELECT 180uF 20% 10V
C19	1-127-558-11	s	ELECT (SOLID) 10uF 20% 10V
C20	1-127-531-11	s	ELECT 20 16V
C21	1-111-008-11	s	ELECT 180uF 20% 10V
C31	1-111-059-11	s	ELECT 220uF 20% 25V
C32	1-163-125-00	s	CERAMIC, CHIP 220PF 5% 50V
C33	1-111-033-11	s	ELECT 180uF 20% 16V
C35	1-163-125-00	s	CERAMIC, CHIP 220PF 5% 50V
C36	1-127-512-00	s	ELECT (SOLID) 10uF 20% 16V
C37	1-111-008-11	s	ELECT 180uF 20% 10V
C39	1-127-558-11	s	ELECT (SOLID) 10uF 20% 10V
C40	1-111-008-11	s	ELECT 180uF 20% 10V
C51	1-111-059-11	s	ELECT 220uF 20% 25V
C52	1-163-125-00	s	CERAMIC, CHIP 220PF 5% 50V
C53	1-127-531-11	s	ELECT 20 16V
C54	1-127-496-00	s	ELECT, SOLID 6.8uF 20% 16V
C55	1-127-485-00	s	ELECT (SOLID) 33uF 20% 6.3V
C56	1-127-558-11	s	ELECT (SOLID) 10uF 20% 10V
C57	1-127-513-00	s	ELECT (SOLID) 15uF 20% 25V
C58	1-127-512-00	s	ELECT (SOLID) 10uF 20% 16V
C60	1-111-110-11	s	ELECT 39uF 20% 50V
C61	1-111-110-11	s	ELECT 39uF 20% 50V
C62	1-163-809-11	s	CERAMIC, CHIP 0.047uF 10% 25V
CN1	1-564-011-11	o	CONNECTOR, 12P, MALE
CN2	1-564-011-11	o	CONNECTOR, 12P, MALE
D11	8-719-980-78	s	DIODE ERA83-006
D12	8-719-980-78	s	DIODE ERA83-006
D31	8-719-980-78	s	DIODE ERA83-006
D32	8-719-980-78	s	DIODE ERA83-006
D51	8-719-938-75	s	DIODE SB05-05CP
D52	8-719-938-75	s	DIODE SB05-05CP
D53	8-719-938-75	s	DIODE SB05-05CP
D54	8-719-938-75	s	DIODE SB05-05CP
D55	8-719-938-75	s	DIODE SB05-05CP
L1	1-410-283-11	s	48uH (WITH CORE)
L11	1-410-283-11	s	48uH (WITH CORE)
L12	1-410-625-11	s	COIL, CHOKE 33uH
L13	1-410-627-11	s	COIL, CHOKE 100uH
L14	1-410-625-11	s	COIL, CHOKE 33uH
L15	1-410-625-11	s	COIL, CHOKE 33uH
L31	1-410-283-11	s	48uH (WITH CORE)
L32	1-410-625-11	s	COIL, CHOKE 33uH
L33	1-410-627-11	s	COIL, CHOKE 100uH
L34	1-410-625-11	s	COIL, CHOKE 33uH
L51	1-424-298-11	s	COIL, CHOKE 82uH
L52	1-424-298-11	s	COIL, CHOKE 82uH
L53	1-424-298-11	s	COIL, CHOKE 82uH

(DC-62A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
Q11	8-729-920-53	s	TRANSISTOR FMY1
Q12	8-729-927-83	s	TRANSISTOR IRFU9020
Q13	8-729-920-53	s	TRANSISTOR FMY1
Q14	8-729-927-83	s	TRANSISTOR IRFU9020
Q31	8-729-920-53	s	TRANSISTOR FMY1
Q32	8-729-927-83	s	TRANSISTOR IRFU9020
Q33	8-729-920-53	s	TRANSISTOR FMY1
Q34	8-729-927-83	s	TRANSISTOR IRFU9020
Q51	8-729-920-53	s	TRANSISTOR FMY1
Q52	8-729-927-83	s	TRANSISTOR IRFU9020
R11	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R12	1-216-049-91	s	METAL 1K 5% 1/10W
R13	1-216-041-00	s	METAL, CHIP 470 5% 1/10W
R14	1-208-814-11	s	CHIP, METAL 22K 0.50% 1/10W
R15	1-216-671-11	s	METAL, CHIP 6.8K 0.5% 1/10W
R16	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R17	1-216-049-91	s	METAL 1K 5% 1/10W
R18	1-216-041-00	s	METAL, CHIP 470 5% 1/10W
R19	1-208-814-11	s	CHIP, METAL 22K 0.50% 1/10W
R21	1-216-649-11	s	METAL, CHIP 820 0.5% 1/10W
R22	1-216-651-11	s	METAL, CHIP 1K 0.5% 1/10W
R31	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R32	1-216-049-91	s	METAL 1K 5% 1/10W
R33	1-216-041-00	s	METAL, CHIP 470 5% 1/10W
R34	1-216-690-11	s	METAL, CHIP 43K 0.5% 1/10W
R35	1-216-671-11	s	METAL, CHIP 6.8K 0.5% 1/10W
R36	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R37	1-216-049-91	s	METAL 1K 5% 1/10W
R38	1-216-041-00	s	METAL, CHIP 470 5% 1/10W
R39	1-216-685-11	s	METAL, CHIP 27K 0.5% 1/10W
R40	1-216-671-11	s	METAL, CHIP 6.8K 0.5% 1/10W
R41	1-216-647-11	s	METAL, CHIP 680 0.5% 1/10W
R51	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R52	1-216-049-91	s	METAL 1K 5% 1/10W
R53	1-216-041-00	s	METAL, CHIP 470 5% 1/10W
R54	1-216-689-11	s	METAL, CHIP 39K 0.5% 1/10W
R56	1-216-603-11	s	METAL, CHIP 10 0.5% 1/10W
R57	1-216-089-91	s	METAL 47K 5% 1/10W
T51	1-426-660-11	s	TRANSFORMER, DC/DC CONVERTER

DC-63A BOARD

Ref. No. or Q'ty	Part No.	SP	Description
C101	1-135-138-11	s	TANTALUM, CHIP 10uF 20% 25V
C102	1-135-138-11	s	TANTALUM, CHIP 10uF 20% 25V
C103	1-135-085-21	s	TANTALUM, CHIP 4.7uF 10% 25V
C104	1-111-059-11	s	ELECT 220uF 20% 25V
C105	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C111	1-135-179-21	s	TANTAL 2.2uF 10% 16V
C112	1-135-177-21	s	TANTALUM, CHIP 1uF 10% 25V
C113	1-135-177-21	s	TANTALUM, CHIP 1uF 10% 25V
C115	1-163-125-00	s	CERAMIC, CHIP 220PF 5% 50V
C116	1-163-033-91	s	CERAMIC 0.022uF 50V
C117	1-163-251-11	s	CERAMIC, CHIP 100PF 5% 50V
C118	1-163-251-11	s	CERAMIC, CHIP 100PF 5% 50V
C119	1-163-033-91	s	CERAMIC 0.022uF 50V
C120	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C133	1-135-177-21	s	TANTALUM, CHIP 1uF 10% 25V
C134	1-163-033-91	s	CERAMIC 0.022uF 50V
C135	1-163-133-00	s	CERAMIC, CHIP 470PF 5% 50V
C136	1-163-133-00	s	CERAMIC, CHIP 470PF 5% 50V
C137	1-163-033-91	s	CERAMIC 0.022uF 50V
C138	1-135-072-21	s	TANTALUM, CHIP 0.22uF 10% 35V
C151	1-135-177-21	s	TANTALUM, CHIP 1uF 10% 25V
C152	1-135-177-21	s	TANTALUM, CHIP 1uF 10% 25V
C153	1-163-033-91	s	CERAMIC 0.022uF 50V
C154	1-163-133-00	s	CERAMIC, CHIP 470PF 5% 50V
CB1	⚠ 1-533-641-11	s	BREAKER, CIRCUIT
D101	8-719-911-55	s	DIODE U05G
D102	8-719-021-31	s	DIODE UZM5.1B
IC101	8-759-700-07	s	IC NJM2903M
IC102	8-759-972-76	s	IC TL1453CNS
IC103	8-759-972-76	s	IC TL1453CNS
IC104	8-759-972-76	s	IC TL1453CNS
PS101	⚠ 1-532-847-21	s	LINK, IC
Q101	8-729-927-83	s	TRANSISTOR IRFU9020
Q102	8-729-901-01	s	TRANSISTOR DTC144EK
Q103	8-729-901-01	s	TRANSISTOR DTC144EK
Q104	8-729-901-01	s	TRANSISTOR DTC144EK
Q105	8-729-900-53	s	TRANSISTOR DTC114EK
Q106	8-729-901-06	s	TRANSISTOR DTA144EK
R101	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R102	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R103	1-216-041-00	s	METAL, CHIP 470 5% 1/10W
R104	1-216-041-00	s	METAL, CHIP 470 5% 1/10W
R105	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R106	1-216-097-91	s	METAL 100K 5% 1/10W
R109	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R110	1-216-077-00	s	METAL, CHIP 15K 5% 1/10W
R111	1-216-667-11	s	METAL, CHIP 4.7K 0.5% 1/10W
R112	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R113	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R114	1-216-667-11	s	METAL, CHIP 4.7K 0.5% 1/10W
R115	1-208-817-11	s	CHIP, METAL 30K 0.50% 1/10W
R116	1-216-666-11	s	METAL, CHIP 4.3K 0.5% 1/10W
R117	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R118	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R119	1-216-079-00	s	METAL, CHIP 18K 5% 1/10W
R120	1-216-093-00	s	METAL, CHIP 68K 5% 1/10W

(DC-63A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R131	1-216-667-11	s	METAL, CHIP 4.7K 0.5% 1/10W
R132	1-216-089-91	s	METAL 47K 5% 1/10W
R134	1-216-667-11	s	METAL, CHIP 4.7K 0.5% 1/10W
R135	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R136	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R151	1-216-079-00	s	METAL, CHIP 18K 5% 1/10W
R152	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R153	1-216-667-11	s	METAL, CHIP 4.7K 0.5% 1/10W
R154	1-216-667-11	s	METAL, CHIP 4.7K 0.5% 1/10W
R155	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R156	1-216-667-11	s	METAL, CHIP 4.7K 0.5% 1/10W
R157	1-216-089-91	s	METAL 47K 5% 1/10W
RV111	1-238-089-11	s	RES, ADJ, 4.7K

MB-506A BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8275-794-A	o	MOUNTED CIRCUIT BOARD, MB-506A
1pc	2-279-715-11	s	RIVET, NYLON
1pc	1-775-420-11	o	CABLE, FLAT (1MM) (10 CORE)
1pc	1-775-421-11	o	CABLE, FLAT (1MM) (24 CORE)
2pcs	1-775-422-11	o	CABLE, FLAT (1MM) (30 CORE)
C1	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C2	1-126-205-11	s	ELECT 47uF 20% 6.3V
C3	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C4	1-126-205-11	s	ELECT 47uF 20% 6.3V
C21	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C22	1-126-204-11	s	ELECT 47uF 20% 16V
C23	1-126-204-11	s	ELECT 47uF 20% 16V
C24	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C25	1-126-204-11	s	ELECT 47uF 20% 16V
C31	1-163-038-91	s	CERAMIC 0.1uF 25V
CN11	1-765-136-11	s	CABLE, FLAT 24P
CN12	1-765-136-11	s	CABLE, FLAT 24P
CN13	1-506-472-11	s	CONNECTOR, 7P, MALE
CN14	1-770-978-11	s	CONNECTOR, FPC 24P
CN15	1-770-977-11	s	CONNECTOR, FPC 10P
CN16	1-765-134-11	s	CABLE, FLAT 24P
CN17	1-765-138-11	s	CABLE, FLAT 30P
CN18	1-765-137-11	s	CABLE, FLAT 26P
CN19	1-764-441-21	s	CONNECTOR, FPC 30P
CN20	1-764-441-21	s	CONNECTOR, FPC 30P
CN21	1-506-491-11	s	CONNECTOR, 12P, MALE
CN22	1-506-473-11	s	CONNECTOR, 8P, MALE
CN23	1-560-356-00	o	CONNECTOR POST HEADER, ILG (2P)
CN24	1-506-703-11	o	CONNECTOR POST HEADER, ILG (4P)
CN25	1-506-702-11	o	CONNECTOR, ILG 3P,
CN26	1-690-107-11	o	CONNECTOR, 12P FEMALE
CN27	1-690-107-11	o	CONNECTOR, 12P FEMALE
CN28	1-566-521-11	s	CONNECTOR, 5P
CN29	1-560-368-00	o	CONNECTOR, POST HEADER ILG 6P
CN30	1-506-467-11	s	CONNECTOR, 2P, MALE
IC1	8-759-300-71	s	IC MC14053BF
PS32	⚠ 1-533-348-11	s	LINK, CHIP IC
Q1	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q2	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q3	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q21	8-729-106-60	s	TRANSISTOR 2SB1115A
Q22	8-729-901-01	s	TRANSISTOR DTC144EK
Q23	8-729-106-60	s	TRANSISTOR 2SB1115A
Q24	8-729-216-22	s	TRANSISTOR 2SA1162
R1	1-216-651-11	s	METAL, CHIP 1K 0.5% 1/10W
R2	1-216-624-11	s	METAL, CHIP 75 0.5% 1/10W
R3	1-216-025-91	s	METAL 100 5% 1/10W
R4	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R5	1-216-651-11	s	METAL, CHIP 1K 0.5% 1/10W
R6	1-216-624-11	s	METAL, CHIP 75 0.5% 1/10W
R7	1-216-025-91	s	METAL 100 5% 1/10W
R8	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R9	1-216-651-11	s	METAL, CHIP 1K 0.5% 1/10W
R10	1-216-624-11	s	METAL, CHIP 75 0.5% 1/10W
R11	1-216-025-91	s	METAL 100 5% 1/10W
R12	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R13	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W

(MB-506A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R21	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R22	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R23	1-216-089-91	s	METAL 47K 5% 1/10W
R24	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R25	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R26	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R27	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R31	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R32	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R33	1-216-619-11	s	METAL, CHIP 47 0.5% 1/10W

MB-530D(N)/530D(P) BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8273-364-A	o	MOUNTED CIRCUIT BOARD, MB-530D(N) [for J,UC]
1pc	A-8273-365-A	o	MOUNTED CIRCUIT BOARD, MB-530D(P) [for CE]
2pcs	1-565-977-11	s	CONTACT, FEMALE AWG 28-32
1pc	1-565-978-11	o	HOUSING, 6P
1pc	1-569-619-11	o	HOUSING, CONNECTOR 4P
C1	1-104-823-11	s	TANTALUM, CHIP 47uF 20% 16V [for CE]
C2	1-135-214-21	s	TANTALUM 4.7uF 20% 20V [for CE]
C3	1-163-038-91	s	CERAMIC 0.1uF 25V
C4	1-107-686-11	s	CHIP, TANTALUM 4.7uF 20% 16V
C9	1-107-686-11	s	CHIP, TANTALUM 4.7uF 20% 16V
C10	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C13	1-163-038-91	s	CERAMIC 0.1uF 25V
C14	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C15	1-163-227-11	s	CERAMIC, CHIP 10PF 5% 50V
C16	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C19	1-104-823-11	s	TANTALUM, CHIP 47uF 20% 16V
C21	1-107-686-11	s	CHIP, TANTALUM 4.7uF 20% 16V
C24	1-163-038-91	s	CERAMIC 0.1uF 25V
C25	1-163-038-91	s	CERAMIC 0.1uF 25V
C26	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C27	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C28	1-113-981-11	s	TANTALUM CHIP 22uF 20% 20V
C29	1-104-666-11	s	ELECT 220uF 20% 25V
C30	1-135-164-21	s	TANTALUM, CHIP 22uF 20% 10V
C31	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C32	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C33	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C34	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C35	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C36	1-126-397-11	s	ELECT, CHIP 33uF 20% 25V
C37	1-126-397-11	s	ELECT, CHIP 33uF 20% 25V
C38	1-126-916-11	s	ELECT 1000uF 20% 6.3V
C40	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C41	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C42	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C43	1-163-235-11	s	CERAMIC, CHIP 22PF 5% 50V [for J,UC]
C44	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V [for J,UC]
C45	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C46	1-126-942-61	s	ELECT 1000uF 20% 25V
C47	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C48	1-164-232-11	s	CERAMIC, CHIP 0.01uF 10% 50V
C50	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C51	1-163-037-11	s	CERAMIC, CHIP 0.022uF 10% 25V
C52	1-113-981-11	s	TANTALUM CHIP 22uF 20% 20V
C53	1-113-981-11	s	TANTALUM CHIP 22uF 20% 20V
C54	1-113-981-11	s	TANTALUM CHIP 22uF 20% 20V
C55	1-135-177-21	s	TANTALUM, CHIP 1uF 10% 25V
C56	1-163-038-91	s	CERAMIC 0.1uF 25V
C60	1-163-038-91	s	CERAMIC 0.1uF 25V
C62	1-135-076-21	s	TANTALUM, CHIP 1uF 10% 35V
C63	1-163-038-91	s	CERAMIC 0.1uF 25V
C64	1-135-070-00	s	TANTALUM, CHIP 0.1uF 10% 35V
C65	1-163-038-91	s	CERAMIC 0.1uF 25V
C66	1-104-913-11	s	TANTALUM, CHIP 10uF 20% 16V
C67	1-107-690-11	s	TANTALUM 6.8uF 20% 35V

(MB-530D(N)/530D(P) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C68	1-104-913-11	s	TANTALUM, CHIP 10uF 20% 16V
C69	1-126-394-11	s	ELECT, CHIP 10uF 20% 16V
C70	1-107-686-11	s	CHIP, TANTALUM 4.7uF 20% 16V
C71	1-135-070-00	s	TANTALUM, CHIP 0.1uF 10% 35V
C72	1-107-686-11	s	CHIP, TANTALUM 4.7uF 20% 16V
C73	1-104-913-11	s	TANTALUM, CHIP 10uF 20% 16V
C74	1-163-038-91	s	CERAMIC 0.1uF 25V
C75	1-164-346-11	s	CERAMIC 1uF 16V
C76	1-126-940-11	s	ELECT 330uF 20% 25V
C80	1-127-518-11	s	ELECT (SOLID) 100uF 20% 16V
CN1	1-566-760-11	s	PIN, CONNECTOR (PC BOARD) 5P
CN2	1-566-767-11	o	PIN, CONNECTOR 12P
CN3	1-566-767-11	o	PIN, CONNECTOR 12P
CN4	1-566-767-11	o	PIN, CONNECTOR 12P
CN5	1-566-760-11	s	PIN, CONNECTOR (PC BOARD) 5P
CN6	1-566-760-11	s	PIN, CONNECTOR (PC BOARD) 5P
CN7	1-506-481-11	s	CONNECTOR, 2P, MALE
CN8	1-506-481-11	s	CONNECTOR, 2P, MALE
CN9	1-506-481-11	s	CONNECTOR, 2P, MALE
CN11	1-691-855-11	s	CONNECTOR, BOARD TO BOARD 60P
CN12	1-691-855-11	s	CONNECTOR, BOARD TO BOARD 60P
CN13	1-691-855-11	s	CONNECTOR, BOARD TO BOARD 60P
CN14	1-691-855-11	s	CONNECTOR, BOARD TO BOARD 60P
CN15	1-691-855-11	s	CONNECTOR, BOARD TO BOARD 60P
CN18	1-566-759-11	o	PIN, CONNECTOR (PC BOARD) 4P
CN19	1-506-481-11	s	CONNECTOR, 2P, MALE
CN20	1-566-199-11	o	PIN, CONNECTOR (PC BOARD) 6P
CN21	1-506-487-11	s	CONNECTOR, 8P, MALE
CN22	1-506-485-11	s	CONNECTOR, 6P, MALE
CN24	1-766-183-11	o	HOUSING, 24P
CN25	1-766-183-11	o	HOUSING, 24P
CN26	1-564-009-11	o	PIN, CONNECTOR 10P
CN27	1-564-011-11	o	CONNECTOR, 12P, MALE
CN28	1-560-368-00	o	CONNECTOR, POST HEADER ILG 6P
CP1	1-760-278-11	s	OSCILLATOR, CRYSTAL (VCO TYPE) [for J,UC]
CP1	1-760-276-11	s	CRYSTAL 28.375MHz [for CE]
D4	8-719-800-76	s	DIODE 1SS226
D5	8-719-104-34	s	DIODE 1S2836
D6	8-719-104-34	s	DIODE 1S2836
D7	8-719-104-34	s	DIODE 1S2836
D8	8-719-105-91	s	DIODE RD5.6M-B2
D9	8-719-104-34	s	DIODE 1S2836
D10	8-719-104-34	s	DIODE 1S2836
D11	8-719-021-31	s	DIODE UZM5.1B
D12	8-719-157-23	s	DIODE RD4.7M-B
FB1	1-543-775-11	s	FILTER, EMI
FB2	1-543-775-11	s	FILTER, EMI
FB3	1-543-775-11	s	FILTER, EMI
FB4	1-543-775-11	s	FILTER, EMI
IC1	8-759-987-82	s	IC 74AC00SJ [for J,UC]
IC1	8-759-081-42	s	IC TC74VHC00F [for CE]
IC2	8-759-925-90	s	IC SN74HC74ANS
IC3	8-752-351-03	s	IC CXD1256AR
IC6	8-759-925-90	s	IC SN74HC74ANS
IC7	8-752-351-03	s	IC CXD1256AR
IC10	8-752-327-46	s	IC CXD1250M
IC11	8-752-327-46	s	IC CXD1250M

(MB-530D(N)/530D(P) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
IC12	8-752-327-46	s	IC CXD1250M
IC13	8-759-985-17	s	IC 74AC04SJ [for J,UC]
IC13	8-759-081-46	s	IC TC74VHCU04F [for CE]
IC14	8-759-906-54	s	IC TL064CNS
IC15	8-759-242-72	s	IC TC7W00F
IC18	8-759-095-59	s	IC M5237ML-TP1
IC19	8-759-906-54	s	IC TL064CNS
L1	1-410-389-31	s	INDUCTOR CHIP 47uH
L3	1-412-282-41	s	INDUCTOR 470uH
L4	1-412-282-41	s	INDUCTOR 470uH
L5	1-410-369-11	s	INDUCTOR CHIP 1uH
L6	1-410-369-11	s	INDUCTOR CHIP 1uH
L7	1-410-369-11	s	INDUCTOR CHIP 1uH
L10	1-410-369-11	s	INDUCTOR CHIP 1uH
L11	1-410-369-11	s	INDUCTOR CHIP 1uH
L12	1-410-369-11	s	INDUCTOR CHIP 1uH
L13	1-410-369-11	s	INDUCTOR CHIP 1uH
Q1	8-729-109-44	s	TRANSISTOR 2SK94
Q4	8-729-216-22	s	TRANSISTOR 2SA1162
Q5	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q6	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q7	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q8	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q9	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q10	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q11	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q12	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q13	8-729-216-22	s	TRANSISTOR 2SA1162
Q14	8-729-109-44	s	TRANSISTOR 2SK94
Q15	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q16	8-729-800-37	s	TRANSISTOR 2SD1048-X7
Q17	8-729-800-71	s	TRANSISTOR 2SB815B7-TB
Q18	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q19	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q20	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q21	8-729-101-07	s	TRANSISTOR 2SB798
Q22	8-729-101-07	s	TRANSISTOR 2SB798
Q23	8-729-807-51	s	TRANSISTOR 2SD1623-S
Q24	8-729-101-07	s	TRANSISTOR 2SB798
Q25	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
R1	1-216-067-00	s	METAL, CHIP 5.6K 5% 1/10W [for CE]
R2	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W [for CE]
R3	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R4	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R5	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R6	1-216-295-00	s	METAL, CHIP 0 5% 1/10W [for J,UC]
R6	1-216-025-91	s	METAL 100 5% 1/10W [for CE]
R7	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R12	1-216-121-91	s	METAL 1M 5% 1/10W
R13	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R14	1-216-295-00	s	METAL, CHIP 0 5% 1/10W [for J,UC]
R14	1-216-025-91	s	METAL 100 5% 1/10W [for CE]
R15	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R21	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R22	1-216-077-00	s	METAL, CHIP 15K 5% 1/10W
R23	1-216-077-00	s	METAL, CHIP 15K 5% 1/10W
R24	1-216-077-00	s	METAL, CHIP 15K 5% 1/10W
R25	1-216-077-00	s	METAL, CHIP 15K 5% 1/10W

(MB-530D(N)/530D(P) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R26	1-216-077-00	s	METAL, CHIP 15K 5% 1/10W
R27	1-216-077-00	s	METAL, CHIP 15K 5% 1/10W
R28	1-216-121-91	s	METAL 1M 5% 1/10W
R29	1-216-121-91	s	METAL 1M 5% 1/10W
R30	1-216-121-91	s	METAL 1M 5% 1/10W
R33	1-216-049-91	s	METAL 1K 5% 1/10W
R34	1-216-049-91	s	METAL 1K 5% 1/10W
R35	1-216-049-91	s	METAL 1K 5% 1/10W
R36	1-216-043-91	s	METAL, CHIP 560 5% 1/10W
R37	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R38	1-216-097-91	s	METAL 100K 5% 1/10W
R39	1-216-097-91	s	METAL 100K 5% 1/10W
R40	1-216-097-91	s	METAL 100K 5% 1/10W
R41	1-216-089-91	s	METAL 47K 5% 1/10W
R42	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R43	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R44	1-216-021-00	s	METAL, CHIP 68 5% 1/10W
R45	1-216-021-00	s	METAL, CHIP 68 5% 1/10W
R46	1-216-021-00	s	METAL, CHIP 68 5% 1/10W
R47	1-216-021-00	s	METAL, CHIP 68 5% 1/10W
R49	1-216-295-00	s	METAL, CHIP 0 5% 1/10W [for CE]
R50	1-216-295-00	s	METAL, CHIP 0 5% 1/10W [for J,UC]
R52	1-216-025-91	s	METAL 100 5% 1/10W
R53	1-216-025-91	s	METAL 100 5% 1/10W
R54	1-216-025-91	s	METAL 100 5% 1/10W
R55	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R56	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R57	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R58	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R59	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R60	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R61	1-216-025-91	s	METAL 100 5% 1/10W
R62	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R64	1-216-049-91	s	METAL 1K 5% 1/10W
R65	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R75	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R76	1-216-033-00	s	METAL, CHIP 220 5% 1/10W
R77	1-208-812-11	s	METAL CHIP 18K 0.50% 1/10W
R78	1-216-661-11	s	METAL, CHIP 2.7K 0.5% 1/10W
R79	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R80	1-216-685-11	s	METAL, CHIP 27K 0.5% 1/10W
R81	1-216-688-11	s	METAL, CHIP 36K 0.5% 1/10W
R82	1-216-688-11	s	METAL, CHIP 36K 0.5% 1/10W
R83	1-216-688-11	s	METAL, CHIP 36K 0.5% 1/10W
R84	1-216-651-11	s	METAL, CHIP 1K 0.5% 1/10W
R85	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R86	1-216-097-91	s	METAL 100K 5% 1/10W
R87	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R88	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R89	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
RV1	1-237-037-11	s	RES, ADJ, METAL 20K
RV2	1-237-037-11	s	RES, ADJ, METAL 20K
RV3	1-237-037-11	s	RES, ADJ, METAL 20K
RV4	1-237-038-11	s	RES, ADJ, METAL 50K
RV5	1-237-038-11	s	RES, ADJ, METAL 50K
RV6	1-237-038-11	s	RES, ADJ, METAL 50K
RV7	1-237-033-11	s	RES, ADJ, METAL 1K
W2	1-953-147-12	o	HARNESS, SUB (SW-1)

(MB-530D(N)/530D(P) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
W3	1-953-148-12	o	HARNESS, SUB (SW-2)

TC-86E/86G BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8273-393-A	o	MOUNTED CIRCUIT BOARD, TC-86G [for CE]
1pc	A-8273-409-A	o	MOUNTED CIRCUIT BOARD, TC-86E [for J,UC]
BT911	1-550-104-32	s	HOLDER, BATTERY
C10	1-164-360-11	s	CERAMIC 0.1uF 16V
C11	1-124-779-00	s	ELECT 10uF 20% 16V
C12	1-164-360-11	s	CERAMIC 0.1uF 16V
C13	1-124-779-00	s	ELECT 10uF 20% 16V
C14	1-164-360-11	s	CERAMIC 0.1uF 16V
C15	1-162-917-11	s	CERAMIC, CHIP 15PF 5% 50V
C16	1-126-397-11	s	ELECT, CHIP 33uF 20% 25V
C17	1-164-360-11	s	CERAMIC 0.1uF 16V
C18	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C19	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C20	1-162-918-11	s	CERAMIC, CHIP 18PF 5% 50V
C21	1-162-917-11	s	CERAMIC, CHIP 15PF 5% 50V
C22	1-162-917-11	s	CERAMIC, CHIP 15PF 5% 50V
C23	1-162-920-11	s	CERAMIC, CHIP 27PF 5% 50V
C24	1-126-390-11	s	ELECT, CHIP 22uF 20% 6.3V
C25	1-164-360-11	s	CERAMIC 0.1uF 16V
C101	1-164-315-11	s	CERAMIC 470PF 5% 50V
C102	1-126-193-11	s	ELECT 1uF 20% 50V
C103	1-128-049-11	s	ELECT, CHIP 1uF 0 50V
C104	1-164-315-11	s	CERAMIC 470PF 5% 50V
C105	1-126-193-11	s	ELECT 1uF 20% 50V
C106	1-162-915-11	s	CERAMIC, CHIP 10PF 0.5PF 50V
C107	1-162-915-11	s	CERAMIC, CHIP 10PF 0.5PF 50V
C108	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C109	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C110	1-163-145-00	s	CERAMIC, CHIP 0.0015uF 5% 50V
C111	1-163-137-00	s	CERAMIC, CHIP 680PF 5% 50V
C112	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C113	1-126-390-11	s	ELECT, CHIP 22uF 20% 6.3V
C114	1-124-779-00	s	ELECT 10uF 20% 16V
C115	1-162-923-11	s	CERAMIC, CHIP 47PF 5% 50V
C116	1-124-779-00	s	ELECT 10uF 20% 16V
C117	1-126-398-11	s	ELECT, CHIP 4.7uF 20% 35V
C118	1-124-779-00	s	ELECT 10uF 20% 16V
C119	1-126-391-11	s	ELECT, CHIP 47uF 20% 6.3V
C120	1-164-360-11	s	CERAMIC 0.1uF 16V
C201	1-164-315-11	s	CERAMIC 470PF 5% 50V
C202	1-126-193-11	s	ELECT 1uF 20% 50V
C203	1-128-049-11	s	ELECT, CHIP 1uF 0 50V
C204	1-164-315-11	s	CERAMIC 470PF 5% 50V
C205	1-126-193-11	s	ELECT 1uF 20% 50V
C206	1-162-915-11	s	CERAMIC, CHIP 10PF 0.5PF 50V
C207	1-162-915-11	s	CERAMIC, CHIP 10PF 0.5PF 50V
C208	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C209	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C210	1-163-145-00	s	CERAMIC, CHIP 0.0015uF 5% 50V
C211	1-163-137-00	s	CERAMIC, CHIP 680PF 5% 50V
C213	1-126-390-11	s	ELECT, CHIP 22uF 20% 6.3V
C214	1-124-779-00	s	ELECT 10uF 20% 16V
C215	1-162-923-11	s	CERAMIC, CHIP 47PF 5% 50V
C216	1-124-779-00	s	ELECT 10uF 20% 16V
C217	1-126-398-11	s	ELECT, CHIP 4.7uF 20% 35V
C218	1-124-779-00	s	ELECT 10uF 20% 16V

(TC-86E/86G BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C219	1-126-391-11	s	ELECT, CHIP 47uF 20% 6.3V
C220	1-126-390-11	s	ELECT, CHIP 22uF 20% 6.3V
C301	1-126-394-11	s	ELECT, CHIP 10uF 20% 16V
C303	1-124-779-00	s	ELECT 10uF 20% 16V
C304	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C401	1-126-394-11	s	ELECT, CHIP 10uF 20% 16V
C403	1-124-779-00	s	ELECT 10uF 20% 16V
C404	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C501	1-164-360-11	s	CERAMIC 0.1uF 16V
C502	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C503	1-164-360-11	s	CERAMIC 0.1uF 16V
C504	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C505	1-164-360-11	s	CERAMIC 0.1uF 16V
C506	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C507	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C508	1-164-360-11	s	CERAMIC 0.1uF 16V
C509	1-164-360-11	s	CERAMIC 0.1uF 16V
C510	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C511	1-164-360-11	s	CERAMIC 0.1uF 16V
C512	1-124-779-00	s	ELECT 10uF 20% 16V
C513	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C550	1-164-360-11	s	CERAMIC 0.1uF 16V
C551	1-163-215-00	s	CERAMIC CHIP 0.0027uF 5% 50V
C552	1-163-141-00	s	CERAMIC, CHIP 0.001uF 5% 50V
C553	1-162-959-11	s	CERAMIC 330PF 5% 50V
C554	1-107-498-11	s	FILM 0.0022uF 2% 50V
C556	1-163-809-11	s	CERAMIC, CHIP 0.047uF 10% 25V
C557	1-107-498-11	s	FILM 0.0022uF 2% 50V
C559	1-107-499-11	s	FILM 0.0039uF 2% 16V
C560	1-163-135-00	s	CERAMIC, CHIP 560PF 5% 50V
C561	1-135-145-11	s	TANTALUM, CHIP 0.47uF 10% 35V
C562	1-164-492-11	s	CERAMIC CHIP 0.15uF 10% 16V
C563	1-164-695-11	s	CERAMIC CHIP 0.0022uF 5% 50V
C564	1-107-828-11	s	FILM 0.015uF 2% 16V
C565	1-164-346-11	s	CERAMIC 1uF 16V
C566	1-164-489-11	s	CERAMIC CHIP 0.22uF 10% 16V
C567	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C568	1-107-829-11	s	FILM 0.056uF 2% 16V
C570	1-163-020-00	s	CERAMIC 0.0082uF 10% 50V
C571	1-164-346-11	s	CERAMIC 1uF 16V
C572	1-107-553-11	s	FILM, CHIP 0.0056uF 2% 16V
C573	1-163-139-00	s	CERAMIC, CHIP 820PF 5% 50V
C574	1-107-827-11	s	FILM 0.01uF 2% 16V
C575	1-164-695-11	s	CERAMIC CHIP 0.0022uF 5% 50V
C576	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C601	1-164-360-11	s	CERAMIC 0.1uF 16V
C602	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C603	1-164-360-11	s	CERAMIC 0.1uF 16V
C604	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C605	1-164-360-11	s	CERAMIC 0.1uF 16V
C606	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C607	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C608	1-164-360-11	s	CERAMIC 0.1uF 16V
C609	1-164-360-11	s	CERAMIC 0.1uF 16V
C610	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C611	1-164-360-11	s	CERAMIC 0.1uF 16V
C612	1-124-779-00	s	ELECT 10uF 20% 16V
C613	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C650	1-164-360-11	s	CERAMIC 0.1uF 16V

(TC-86E/86G BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C651	1-163-215-00	s	CERAMIC CHIP 0.0027uF 5% 50V
C652	1-163-141-00	s	CERAMIC, CHIP 0.001uF 5% 50V
C653	1-162-959-11	s	CERAMIC 330PF 5% 50V
C654	1-107-498-11	s	FILM 0.0022uF 2% 50V
C656	1-163-809-11	s	CERAMIC, CHIP 0.047uF 10% 25V
C657	1-107-498-11	s	FILM 0.0022uF 2% 50V
C659	1-107-499-11	s	FILM 0.0039uF 2% 16V
C660	1-163-135-00	s	CERAMIC, CHIP 560PF 5% 50V
C661	1-135-145-11	s	TANTALUM, CHIP 0.47uF 10% 35V
C662	1-164-492-11	s	CERAMIC CHIP 0.15uF 10% 16V
C663	1-164-695-11	s	CERAMIC CHIP 0.0022uF 5% 50V
C664	1-107-828-11	s	FILM 0.015uF 2% 16V
C665	1-164-346-11	s	CERAMIC 1uF 16V
C666	1-164-489-11	s	CERAMIC CHIP 0.22uF 10% 16V
C667	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C668	1-107-829-11	s	FILM 0.056uF 2% 16V
C670	1-163-020-00	s	CERAMIC 0.0082uF 10% 50V
C671	1-164-346-11	s	CERAMIC 1uF 16V
C672	1-107-553-11	s	FILM, CHIP 0.0056uF 2% 16V
C673	1-163-139-00	s	CERAMIC, CHIP 820PF 5% 50V
C674	1-107-827-11	s	FILM 0.01uF 2% 16V
C675	1-164-695-11	s	CERAMIC CHIP 0.0022uF 5% 50V
C676	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C701	1-164-315-11	s	CERAMIC 470PF 5% 50V
C702	1-126-193-11	s	ELECT 1uF 20% 50V
C704	1-164-315-11	s	CERAMIC 470PF 5% 50V
C705	1-126-193-11	s	ELECT 1uF 20% 50V
C706	1-126-193-11	s	ELECT 1uF 20% 50V
C707	1-162-915-11	s	CERAMIC, CHIP 10PF 0.5PF 50V
C708	1-162-915-11	s	CERAMIC, CHIP 10PF 0.5PF 50V
C709	1-135-149-21	s	TANTALUM, CHIP 2.2uF 10% 10V
C710	1-135-149-21	s	TANTALUM, CHIP 2.2uF 10% 10V
C713	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C714	1-164-227-11	s	CERAMIC 0.022uF 10% 25V
C715	1-164-004-11	s	CERAMIC, CHIP 0.1uF 10% 25V
C716	1-128-024-11	s	ELECT, CHIP 4.7uF 0 10V
C717	1-126-392-11	s	ELECT, CHIP 100uF 20% 6.3V
C718	1-126-392-11	s	ELECT, CHIP 100uF 20% 6.3V
C719	1-163-809-11	s	CERAMIC, CHIP 0.047uF 10% 25V
C720	1-126-412-11	s	ELECT 220uF 20% 4V
C721	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C722	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C723	1-110-410-11	s	ELECT CHIP 10uF 20% 6.3V
C724	1-124-779-00	s	ELECT 10uF 20% 16V
C725	1-124-779-00	s	ELECT 10uF 20% 16V
C726	1-124-779-00	s	ELECT 10uF 20% 16V
C728	1-135-149-21	s	TANTALUM, CHIP 2.2uF 10% 10V
C729	1-164-505-11	s	CERAMIC CHIP 2.2uF 16V
C730	1-164-505-11	s	CERAMIC CHIP 2.2uF 16V
C801	1-162-921-11	s	CERAMIC, CHIP 33PF 5% 50V
C802	1-162-922-11	s	CERAMIC, CHIP 39PF 5% 50V
C803	1-162-995-11	s	CERAMIC, CHIP 0.022uF 50V
C804	1-162-995-11	s	CERAMIC, CHIP 0.022uF 50V
C806	1-164-357-11	s	CERAMIC 1000PF 5% 50V
C808	1-135-145-11	s	TANTALUM, CHIP 0.47uF 10% 35V
C809	1-135-210-11	s	TANTALUM 4.7uF 10% 10V
C810	1-164-730-11	s	CERAMIC CHIP 0.0012uF 5% 50V
C811	1-126-391-11	s	ELECT, CHIP 47uF 20% 6.3V
C812	1-126-391-11	s	ELECT, CHIP 47uF 20% 6.3V

(TC-86E/86G BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C813	1-162-923-11	s	CERAMIC, CHIP 47PF 5% 50V
C815	1-162-568-11	s	CERAMIC, CHIP 0.33uF 25V
C816	1-126-394-11	s	ELECT, CHIP 10uF 20% 16V
C817	1-164-360-11	s	CERAMIC 0.1uF 16V
C901	1-164-361-11	s	CERAMIC 0.047uF 16V
C902	1-162-995-11	s	CERAMIC, CHIP 0.022uF 50V
C910	1-162-995-11	s	CERAMIC, CHIP 0.022uF 50V
C911	1-126-601-11	s	ELECT 2.2uF 20% 50V
C912	1-126-601-11	s	ELECT 2.2uF 20% 50V
C913	1-124-779-00	s	ELECT 10uF 20% 16V
C914	1-164-360-11	s	CERAMIC 0.1uF 16V
C915	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C916	1-164-227-11	s	CERAMIC 0.022uF 10% 25V
C917	1-126-206-11	s	ELECT 100uF 20% 6.3V
C918	1-124-779-00	s	ELECT 10uF 20% 16V
C919	1-164-360-11	s	CERAMIC 0.1uF 16V
CN1	1-764-441-21	s	CONNECTOR, FPC 30P
CN2	1-764-441-21	s	CONNECTOR, FPC 30P
CN3	1-573-290-21	s	PIN, CONNECTOR (1.5MM). (SMD)4P
CN101	1-691-550-11	s	PIN, CONNECTOR 3P
CN102	1-691-550-11	s	PIN, CONNECTOR 3P
CN201	1-691-550-11	s	PIN, CONNECTOR 3P
CN701	1-691-550-11	s	PIN, CONNECTOR 3P
CN702	1-691-551-11	s	PIN, CONNECTOR 8P
CN703	1-580-055-21	s	PIN, CONNECTOR 2P
CV1	1-141-345-11	s	CAP, TRIMMER 40PF
D1	8-719-059-49	s	DIODE EBR3368S
D4	8-719-106-22	s	DIODE RD7.5M-B1
D5	8-719-105-90	s	DIODE RD5.6M-B1
D6	8-719-027-50	s	DIODE MA142WK
D101	8-719-820-41	s	DIODE 1SS302
D102	8-719-820-41	s	DIODE 1SS302
D103	8-719-820-41	s	DIODE 1SS302
D104	8-719-820-41	s	DIODE 1SS302
D105	8-719-820-41	s	DIODE 1SS302
D201	8-719-820-41	s	DIODE 1SS302
D202	8-719-820-41	s	DIODE 1SS302
D203	8-719-820-41	s	DIODE 1SS302
D204	8-719-820-41	s	DIODE 1SS302
D205	8-719-820-41	s	DIODE 1SS302
D550	8-719-820-41	s	DIODE 1SS302
D701	8-719-820-41	s	DIODE 1SS302
D702	8-719-820-41	s	DIODE 1SS302
D704	8-719-024-81	s	DIODE 1SS300-TE85L
D705	8-719-024-81	s	DIODE 1SS300-TE85L
D706	8-719-820-41	s	DIODE 1SS302
D707	8-719-820-41	s	DIODE 1SS302
D708	8-719-820-41	s	DIODE 1SS302
D802	8-719-105-28	s	DIODE RD2.4M-B
D803	8-719-105-28	s	DIODE RD2.4M-B
D804	8-719-820-41	s	DIODE 1SS302
D805	8-719-820-41	s	DIODE 1SS302
D901	8-719-987-41	s	DIODE CL-150Y-CD
D902	8-719-987-41	s	DIODE CL-150Y-CD
D903	8-719-987-41	s	DIODE CL-150Y-CD
D904	8-719-987-41	s	DIODE CL-150Y-CD
D905	8-719-987-41	s	DIODE CL-150Y-CD

(TC-86E/86G BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
D906	8-719-987-41	s	DIODE CL-150Y-CD
D907	8-719-987-41	s	DIODE CL-150Y-CD
D908	8-719-987-41	s	DIODE CL-150Y-CD
D909	8-719-938-72	s	DIODE SB01-05CP
D911	8-719-938-72	s	DIODE SB01-05CP
D912	8-719-059-30	s	DIODE MA142A-(TX)
IC1	8-759-346-32	s	IC UPD78064-029-3BA
IC2	8-759-948-48	s	IC RH5RA50A
IC3	8-759-089-05	s	IC BR93LC46F
IC10	8-759-346-30	s	IC UPD75516GF-598-3B9
IC101	8-759-111-56	s	IC UPC4572G2
IC102	8-759-710-77	s	IC NJM4560MD
IC103	8-759-710-77	s	IC NJM4560MD
IC104	8-759-111-56	s	IC UPC4572G2
IC105	8-759-710-77	s	IC NJM4560MD
IC110	8-759-208-09	s	IC TC4052BFHB
IC111	8-759-066-57	s	IC TC74HC4066AFS
IC113	8-759-242-64	s	IC TC4W53F
IC126	8-759-701-01	s	IC NJM2904M
IC201	8-759-111-56	s	IC UPC4572G2
IC202	8-759-710-77	s	IC NJM4560MD
IC205	8-759-710-77	s	IC NJM4560MD
IC210	8-759-208-09	s	IC TC4052BFHB
IC211	8-759-066-57	s	IC TC74HC4066AFS
IC213	8-759-242-64	s	IC TC4W53F
IC301	8-759-066-61	s	IC TC4053BFS
IC303	8-759-604-64	s	IC M5203FP-T2
IC304	8-759-510-71	s	IC BA10358F-E2
IC403	8-759-604-64	s	IC M5203FP-T2
IC501	8-759-710-77	s	IC NJM4560MD
IC502	8-759-100-96	s	IC UPC4558G2
IC503	8-759-100-96	s	IC UPC4558G2
IC504	8-759-100-96	s	IC UPC4558G2
IC550	8-752-031-28	s	IC CXA1098Q
IC602	8-759-100-96	s	IC UPC4558G2
IC603	8-759-100-96	s	IC UPC4558G2
IC701	8-759-111-56	s	IC UPC4572G2
IC702	8-759-710-77	s	IC NJM4560MD
IC703	8-759-711-58	s	IC NJM78L05UA
IC705	8-759-075-68	s	IC TC4066BFS
IC708	8-759-700-50	s	IC NJM386M
IC709	8-759-066-57	s	IC TC74HC4066AFS
IC710	8-759-710-77	s	IC NJM4560MD
IC711	8-759-066-61	s	IC TC4053BFS
IC801	8-759-944-79	s	IC CXD1132Q
IC802	8-759-925-74	s	IC SN74HC04ANS
IC803	8-759-300-71	s	IC MC14053BF
IC804	8-759-300-71	s	IC MC14053BF
IC805	8-759-700-45	s	IC NJM4556M-A
IC806	8-759-510-71	s	IC BA10358F-E2
IC807	8-759-009-02	s	IC MC14046BF
IC911	8-759-946-03	s	IC S-8054ALR-LN-S
L2	1-410-393-11	s	INDUCTOR CHIP 100uH
L3	1-410-393-11	s	INDUCTOR CHIP 100uH
L4	1-410-381-11	s	INDUCTOR CHIP 10uH
L101	1-410-380-31	s	INDUCTOR CHIP 8.2uH
L102	1-410-380-31	s	INDUCTOR CHIP 8.2uH

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Ref. No. or Q'ty	Part No.	SP	Description
L201	1-410-380-31	s	INDUCTOR CHIP 8.2uH
L202	1-410-380-31	s	INDUCTOR CHIP 8.2uH
L701	1-410-380-31	s	INDUCTOR CHIP 8.2uH
L702	1-410-380-31	s	INDUCTOR CHIP 8.2uH
L703	1-408-797-11	s	INDUCTOR CHIP 470uH
L901	1-410-369-11	s	INDUCTOR CHIP 1uH
L911	1-410-381-11	s	INDUCTOR CHIP 10uH
ND1	1-810-463-11	s	DISPLAY, LCD
PH101	1-808-252-11	s	PHOTOCOUPLER M-30
Q1	8-729-905-18	s	TRANSISTOR DTC144EU
Q2	8-729-905-18	s	TRANSISTOR DTC144EU
Q101	8-729-117-32	s	TRANSISTOR 2SC4177
Q102	8-729-905-12	s	TRANSISTOR DTA144EU
Q103	8-729-905-18	s	TRANSISTOR DTC144EU
Q104	8-729-905-18	s	TRANSISTOR DTC144EU
Q105	8-729-905-18	s	TRANSISTOR DTC144EU
Q106	8-729-117-32	s	TRANSISTOR 2SC4177
Q107	8-729-905-18	s	TRANSISTOR DTC144EU
Q108	8-729-117-32	s	TRANSISTOR 2SC4177
Q109	8-729-117-32	s	TRANSISTOR 2SC4177
Q110	8-729-117-32	s	TRANSISTOR 2SC4177
Q111	8-729-907-00	s	TRANSISTOR DTC114EU
Q113	8-729-117-16	s	TRANSISTOR 2SA1611-M6
Q114	8-729-905-18	s	TRANSISTOR DTC144EU
Q115	8-729-905-12	s	TRANSISTOR DTA144EU
Q116	8-729-905-18	s	TRANSISTOR DTC144EU
Q117	8-729-117-32	s	TRANSISTOR 2SC4177
Q118	8-729-905-18	s	TRANSISTOR DTC144EU
Q201	8-729-117-32	s	TRANSISTOR 2SC4177
Q202	8-729-905-12	s	TRANSISTOR DTA144EU
Q204	8-729-905-18	s	TRANSISTOR DTC144EU
Q206	8-729-117-32	s	TRANSISTOR 2SC4177
Q207	8-729-905-18	s	TRANSISTOR DTC144EU
Q208	8-729-117-32	s	TRANSISTOR 2SC4177
Q209	8-729-117-32	s	TRANSISTOR 2SC4177
Q210	8-729-117-32	s	TRANSISTOR 2SC4177
Q211	8-729-907-00	s	TRANSISTOR DTC114EU
Q213	8-729-117-16	s	TRANSISTOR 2SA1611-M6
Q214	8-729-905-18	s	TRANSISTOR DTC144EU
Q215	8-729-905-12	s	TRANSISTOR DTA144EU
Q216	8-729-905-18	s	TRANSISTOR DTC144EU
Q217	8-729-117-32	s	TRANSISTOR 2SC4177
Q218	8-729-905-18	s	TRANSISTOR DTC144EU
Q301	8-729-117-32	s	TRANSISTOR 2SC4177
Q302	8-729-117-32	s	TRANSISTOR 2SC4177
Q401	8-729-117-32	s	TRANSISTOR 2SC4177
Q402	8-729-117-32	s	TRANSISTOR 2SC4177
Q550	8-729-905-12	s	TRANSISTOR DTA144EU
Q703	8-729-117-32	s	TRANSISTOR 2SC4177
Q704	8-729-141-75	s	TRANSISTOR 2SD596DV345
Q705	8-729-117-32	s	TRANSISTOR 2SC4177
Q706	8-729-141-48	s	TRANSISTOR 2SB624-BV345
Q707	8-729-905-18	s	TRANSISTOR DTC144EU
Q708	8-729-141-48	s	TRANSISTOR 2SB624-BV345
Q709	8-729-905-12	s	TRANSISTOR DTA144EU
Q710	8-729-117-16	s	TRANSISTOR 2SA1611-M6
Q711	8-729-141-48	s	TRANSISTOR 2SB624-BV345

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Ref. No. or Q'ty	Part No.	SP	Description
Q712	8-729-905-18	s	TRANSISTOR DTC144EU
Q713	8-729-141-75	s	TRANSISTOR 2SD596DV345
Q714	8-729-905-12	s	TRANSISTOR DTA144EU
Q715	8-729-905-12	s	TRANSISTOR DTA144EU
Q716	8-729-209-07	s	TRANSISTOR 2SC4213-B
Q717	8-729-209-07	s	TRANSISTOR 2SC4213-B
Q801	8-729-905-18	s	TRANSISTOR DTC144EU
Q901	8-729-230-49	s	TRANSISTOR 2SC2712-YG
Q902	8-729-230-49	s	TRANSISTOR 2SC2712-YG
Q911	8-729-905-23	s	TRANSISTOR 2SA1576R
Q912	8-729-920-39	s	TRANSISTOR IMT1US
Q913	8-729-142-90	s	TRANSISTOR 2SK853-K5
Q914	8-729-920-39	s	TRANSISTOR IMT1US
Q915	8-729-905-18	s	TRANSISTOR DTC144EU
Q916	8-729-117-32	s	TRANSISTOR 2SC4177
Q917	8-729-907-26	s	TRANSISTOR IMX1
R1	1-216-812-11	s	METAL, CHIP 180 5% 1/16W
R2	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R3	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R4	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R5	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R6	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R7	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R8	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R9	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R10	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R11	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R12	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R13	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R14	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R15	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R16	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R17	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R18	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R19	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R20	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R21	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R22	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R23	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R24	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R25	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R26	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R27	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R28	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R29	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R30	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R31	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R32	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R33	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R34	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R35	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R36	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R37	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R38	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R39	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R40	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R42	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R43	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R44	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R45	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R46	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R47	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R48	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R49	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R50	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R51	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R52	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R53	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R54	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R55	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R56	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R57	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R59	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R60	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R61	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R62	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R63	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R64	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R65	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R66	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R67	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R68	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R69	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R70	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R71	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R72	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R73	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R74	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R75	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R76	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R77	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R78	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R79	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R80	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R81	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R82	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R83	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R84	1-216-851-11	s	METAL, CHIP 330K 5% 1/16W
R85	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R86	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R87	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R88	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R89	1-216-797-11	s	METAL, CHIP 10 5% 1/16W
R90	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R91	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R92	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R93	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R95	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R96	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R97	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R98	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R99	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R101	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R102	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R103	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R104	1-218-695-11	s	METAL 1.3K 0.50% 1/16W
R105	1-218-697-11	s	METAL 1.6K 0.50% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R106	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R107	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R108	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R109	1-218-740-11	s	METAL 100K 0.50% 1/16W
R110	1-218-740-11	s	METAL 100K 0.50% 1/16W
R111	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R112	1-218-702-11	s	METAL, CHIP 2.7K 0.50% 1/16W
R113	1-218-677-11	s	METAL 240 0.50% 1/16W
R114	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R115	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R116	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R117	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R118	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R119	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R120	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R121	1-218-736-11	s	METAL 68K 0.50% 1/16W
R122	1-218-899-11	s	CHIP, METAL 150K 0.50% 1/16W
R123	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R124	1-218-705-11	s	METAL 3.6K 0.50% 1/16W
R125	1-218-705-11	s	METAL 3.6K 0.50% 1/16W
R126	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R127	1-218-699-11	s	METAL, CHIP 2K 0.50% 1/16W
R128	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R129	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R130	1-218-901-11	s	CHIP, METAL 180K 0.50% 1/16W
R131	1-216-801-11	s	METAL, CHIP 22 5% 1/16W
R132	1-216-810-11	s	METAL, CHIP 120 5% 1/16W
R133	1-218-684-11	s	METAL 470 0.50% 1/16W
R134	1-218-722-11	s	METAL, CHIP 18K 0.50% 1/16W
R135	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R136	1-218-716-11	s	METAL 10K 0.50% 1/16W
R137	1-218-723-11	s	METAL 20K 0.50% 1/16W
R138	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R139	1-218-723-11	s	METAL 20K 0.50% 1/16W
R140	1-218-684-11	s	METAL 470 0.50% 1/16W
R141	1-218-702-11	s	METAL, CHIP 2.7K 0.50% 1/16W
R142	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R143	1-216-817-11	s	METAL, CHIP 470 5% 1/16W
R144	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R145	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R146	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R147	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R148	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R149	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R150	1-218-688-11	s	METAL 680 0.50% 1/16W
R151	1-218-688-11	s	METAL 680 0.50% 1/16W
R153	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R154	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R156	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R157	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R158	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R159	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R160	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R161	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R162	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R163	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R165	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R166	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R167	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R168	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R171	1-216-853-11	s	METAL, CHIP 470K 5% 1/16W
R172	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R173	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R174	1-218-670-11	s	METAL 120 0.50% 1/16W
R175	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R201	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R202	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R203	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R204	1-218-695-11	s	METAL 1.3K 0.50% 1/16W
R205	1-218-697-11	s	METAL 1.6K 0.50% 1/16W
R207	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R208	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R209	1-218-740-11	s	METAL 100K 0.50% 1/16W
R210	1-218-740-11	s	METAL 100K 0.50% 1/16W
R211	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R212	1-218-702-11	s	METAL, CHIP 2.7K 0.50% 1/16W
R213	1-218-677-11	s	METAL 240 0.50% 1/16W
R214	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R215	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R216	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R217	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R218	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R219	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R220	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R221	1-218-736-11	s	METAL 68K 0.50% 1/16W
R222	1-218-899-11	s	CHIP, METAL 150K 0.50% 1/16W
R223	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R224	1-218-705-11	s	METAL 3.6K 0.50% 1/16W
R225	1-218-705-11	s	METAL 3.6K 0.50% 1/16W
R226	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R227	1-218-699-11	s	METAL, CHIP 2K 0.50% 1/16W
R228	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R229	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R230	1-218-901-11	s	CHIP, METAL 180K 0.50% 1/16W
R231	1-216-801-11	s	METAL, CHIP 22 5% 1/16W
R232	1-216-810-11	s	METAL, CHIP 120 5% 1/16W
R233	1-218-684-11	s	METAL 470 0.50% 1/16W
R234	1-218-722-11	s	METAL, CHIP 18K 0.50% 1/16W
R235	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R236	1-218-716-11	s	METAL 10K 0.50% 1/16W
R237	1-218-723-11	s	METAL 20K 0.50% 1/16W
R238	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R239	1-218-723-11	s	METAL 20K 0.50% 1/16W
R240	1-218-684-11	s	METAL 470 0.50% 1/16W
R241	1-218-702-11	s	METAL, CHIP 2.7K 0.50% 1/16W
R242	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R243	1-216-817-11	s	METAL, CHIP 470 5% 1/16W
R244	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R245	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R246	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R249	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R250	1-218-688-11	s	METAL 680 0.50% 1/16W
R251	1-218-688-11	s	METAL 680 0.50% 1/16W
R256	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R257	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R258	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R259	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R260	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R261	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R262	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R263	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R265	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R266	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R267	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R268	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R271	1-216-853-11	s	METAL, CHIP 470K 5% 1/16W
R272	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R273	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R274	1-218-670-11	s	METAL 120 0.50% 1/16W
R275	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R301	1-218-716-11	s	METAL 10K 0.50% 1/16W
R302	1-218-716-11	s	METAL 10K 0.50% 1/16W
R303	1-216-817-11	s	METAL, CHIP 470 5% 1/16W
R304	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R305	1-218-722-11	s	METAL, CHIP 18K 0.50% 1/16W
R306	1-218-722-11	s	METAL, CHIP 18K 0.50% 1/16W
R307	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R308	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R309	1-218-706-11	s	METAL 3.9K 0.50% 1/16W
R311	1-218-720-11	s	METAL 15K 0.50% 1/16W
R312	1-218-668-11	s	METAL 100 0.50% 1/16W
R313	1-216-836-11	s	METAL, CHIP 18K 5% 1/16W
R314	1-216-836-11	s	METAL, CHIP 18K 5% 1/16W
R315	1-218-772-11	s	METAL 680K 0.50% 1/10W
R316	1-218-732-11	s	METAL 47K 0.50% 1/16W
R317	1-218-732-11	s	METAL 47K 0.50% 1/16W
R319	1-218-716-11	s	METAL 10K 0.50% 1/16W
R320	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R322	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R323	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R401	1-218-716-11	s	METAL 10K 0.50% 1/16W
R402	1-218-716-11	s	METAL 10K 0.50% 1/16W
R403	1-216-817-11	s	METAL, CHIP 470 5% 1/16W
R405	1-218-722-11	s	METAL, CHIP 18K 0.50% 1/16W
R406	1-218-722-11	s	METAL, CHIP 18K 0.50% 1/16W
R408	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R409	1-218-706-11	s	METAL 3.9K 0.50% 1/16W
R411	1-218-720-11	s	METAL 15K 0.50% 1/16W
R412	1-218-668-11	s	METAL 100 0.50% 1/16W
R413	1-216-836-11	s	METAL, CHIP 18K 5% 1/16W
R414	1-216-836-11	s	METAL, CHIP 18K 5% 1/16W
R415	1-218-772-11	s	METAL 680K 0.50% 1/10W
R416	1-218-732-11	s	METAL 47K 0.50% 1/16W
R417	1-218-732-11	s	METAL 47K 0.50% 1/16W
R419	1-218-716-11	s	METAL 10K 0.50% 1/16W
R420	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R422	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R423	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R501	1-218-716-11	s	METAL 10K 0.50% 1/16W
R502	1-218-716-11	s	METAL 10K 0.50% 1/16W
R503	1-218-716-11	s	METAL 10K 0.50% 1/16W
R504	1-218-716-11	s	METAL 10K 0.50% 1/16W
R505	1-208-854-11	s	METAL 1M 0.50% 1/10W
R506	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R507	1-218-692-11	s	METAL 1K 0.50% 1/16W
R508	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R509	1-218-692-11	s	METAL 1K 0.50% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R510	1-218-692-11	s	METAL 1K 0.50% 1/16W
R511	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R512	1-218-692-11	s	METAL 1K 0.50% 1/16W
R513	1-218-697-11	s	METAL 1.6K 0.50% 1/16W
R514	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R515	1-208-854-11	s	METAL 1M 0.50% 1/10W
R516	1-218-706-11	s	METAL 3.9K 0.50% 1/16W
R517	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R518	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R519	1-218-841-11	s	METAL, CHIP 560 0.50% 1/16W
R550	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R551	1-218-856-11	s	CHIP, METAL 2.4K 0.50% 1/16W
R552	1-218-856-11	s	CHIP, METAL 2.4K 0.50% 1/16W
R554	1-218-724-11	s	METAL 22K 0.50% 1/16W
R555	1-218-698-11	s	METAL 1.8K 0.50% 1/16W
R556	1-216-857-11	s	METAL, CHIP 1M 5% 1/16W
R557	1-218-841-11	s	METAL, CHIP 560 0.50% 1/16W
R558	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R559	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R560	1-218-724-11	s	METAL 22K 0.50% 1/16W
R561	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R562	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R563	1-218-868-11	s	METAL, CHIP 7.5K 0.50% 1/16W
R564	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R565	1-218-688-11	s	METAL 680 0.50% 1/16W
R566	1-218-870-11	s	METAL, CHIP 9.1K 0.50% 1/16W
R567	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R568	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R579	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R601	1-218-716-11	s	METAL 10K 0.50% 1/16W
R602	1-218-716-11	s	METAL 10K 0.50% 1/16W
R603	1-218-716-11	s	METAL 10K 0.50% 1/16W
R604	1-218-716-11	s	METAL 10K 0.50% 1/16W
R605	1-208-854-11	s	METAL 1M 0.50% 1/10W
R606	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R607	1-218-692-11	s	METAL 1K 0.50% 1/16W
R608	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R609	1-218-692-11	s	METAL 1K 0.50% 1/16W
R610	1-218-692-11	s	METAL 1K 0.50% 1/16W
R611	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R612	1-218-692-11	s	METAL 1K 0.50% 1/16W
R613	1-218-697-11	s	METAL 1.6K 0.50% 1/16W
R614	1-218-844-11	s	METAL, CHIP 750 0.50% 1/16W
R615	1-208-854-11	s	METAL 1M 0.50% 1/10W
R616	1-218-706-11	s	METAL 3.9K 0.50% 1/16W
R617	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R618	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R619	1-218-841-11	s	METAL, CHIP 560 0.50% 1/16W
R651	1-218-856-11	s	CHIP, METAL 2.4K 0.50% 1/16W
R652	1-218-856-11	s	CHIP, METAL 2.4K 0.50% 1/16W
R653	1-218-743-11	s	METAL 130K 0.50% 1/16W
R654	1-218-724-11	s	METAL 22K 0.50% 1/16W
R655	1-218-698-11	s	METAL 1.8K 0.50% 1/16W
R656	1-216-857-11	s	METAL, CHIP 1M 5% 1/16W
R657	1-218-841-11	s	METAL, CHIP 560 0.50% 1/16W
R658	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R659	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R660	1-218-724-11	s	METAL 22K 0.50% 1/16W
R661	1-216-295-00	s	METAL, CHIP 0 5% 1/10W

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Ref. No. or Q'ty	Part No.	SP	Description
R662	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R663	1-218-868-11	s	METAL, CHIP 7.5K 0.50% 1/16W
R664	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R665	1-218-688-11	s	METAL 680 0.50% 1/16W
R666	1-218-870-11	s	METAL, CHIP 9.1K 0.50% 1/16W
R667	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R668	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R669	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R701	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R702	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R703	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R704	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R705	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R706	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R707	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R708	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R709	1-218-867-11	s	METAL, CHIP 6.8K 0.50% 1/16W
R710	1-216-853-11	s	METAL, CHIP 470K 5% 1/16W
R711	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R712	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R713	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R714	1-218-708-11	s	METAL 4.7K 0.50% 1/16W
R715	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R716	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R717	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R718	1-218-829-11	s	METAL, CHIP 180 0.50% 1/16W
R719	1-218-829-11	s	METAL, CHIP 180 0.50% 1/16W
R720	1-218-829-11	s	METAL, CHIP 180 0.50% 1/16W
R721	1-218-829-11	s	METAL, CHIP 180 0.50% 1/16W
R722	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R723	1-218-858-11	s	METAL, CHIP 3K 0.50% 1/16W
R724	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R725	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R726	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R727	1-216-847-11	s	METAL, CHIP 150K 5% 1/16W
R728	1-216-854-11	s	METAL, CHIP 560K 5% 1/16W
R729	1-218-833-11	s	METAL, CHIP 270 0.50% 1/16W
R730	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R731	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R732	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R733	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R734	1-218-722-11	s	METAL, CHIP 18K 0.50% 1/16W
R735	1-218-873-11	s	METAL, CHIP 12K 0.50% 1/16W
R736	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R737	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R738	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R739	1-216-825-11	s	METAL, CHIP 2.2K 5% 1/16W
R740	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R741	1-218-868-11	s	METAL, CHIP 7.5K 0.50% 1/16W
R742	1-218-672-11	s	METAL 150 0.50% 1/16W
R743	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R744	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R745	1-216-797-11	s	METAL, CHIP 10 5% 1/16W
R746	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R747	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R748	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R749	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R750	1-218-680-11	s	METAL 330 0.50% 1/16W
R751	1-218-680-11	s	METAL 330 0.50% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R752	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R753	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R754	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R755	1-218-851-11	s	METAL, CHIP 1.5K 0.50% 1/16W
R756	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R757	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R758	1-218-710-11	s	METAL, CHIP 5.6K 0.50% 1/16W
R759	1-218-706-11	s	METAL 3.9K 0.50% 1/16W
R760	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R761	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R762	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R763	1-218-704-11	s	METAL 3.3K 0.50% 1/16W
R764	1-218-866-11	s	METAL, CHIP 6.2K 0.50% 1/16W
R765	1-211-969-11	s	METAL CHIP 10 0.50% 1/16W
R766	1-211-969-11	s	METAL CHIP 10 0.50% 1/16W
R767	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R768	1-218-694-11	s	METAL, CHIP 1.2K 0.50% 1/16W
R769	1-211-969-11	s	METAL CHIP 10 0.50% 1/16W
R770	1-218-694-11	s	METAL, CHIP 1.2K 0.50% 1/16W
R771	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R772	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R773	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R774	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R775	1-218-704-11	s	METAL 3.3K 0.50% 1/16W
R776	1-218-704-11	s	METAL 3.3K 0.50% 1/16W
R778	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R779	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R780	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R781	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R782	1-218-692-11	s	METAL 1K 0.50% 1/16W
R783	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R785	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W
R786	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R788	1-218-702-11	s	METAL, CHIP 2.7K 0.50% 1/16W
R789	1-218-702-11	s	METAL, CHIP 2.7K 0.50% 1/16W
R790	1-218-851-11	s	METAL, CHIP 1.5K 0.50% 1/16W
R792	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R794	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R797	1-211-969-11	s	METAL CHIP 10 0.50% 1/16W
R801	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R804	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R805	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R806	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R807	1-216-861-11	s	METAL 2.2M 5% 1/16W
R808	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R809	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R810	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R811	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R812	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R813	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R814	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R815	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R816	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R817	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R818	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R819	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R820	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R821	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R822	1-216-809-11	s	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R823	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R824	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R825	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R826	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R827	1-216-805-11	s	METAL, CHIP 47 5% 1/16W
R828	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R829	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R830	1-218-851-11	s	METAL, CHIP 1.5K 0.50% 1/16W
R831	1-218-874-11	s	METAL, CHIP 13K 0.50% 1/16W [for J,UC]
R831	1-218-727-11	s	METAL 30K 0.50% 1/16W [for CE]
R832	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R833	1-218-704-11	s	METAL 3.3K 0.50% 1/16W [for J,UC]
R833	1-218-858-11	s	METAL, CHIP 3K 0.50% 1/16W [for CE]
R834	1-211-990-11	s	METAL CHIP 75 0.50% 1/16W
R835	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R836	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R837	1-216-835-11	s	METAL, CHIP 15K 5% 1/16W
R838	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R839	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R840	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R841	1-216-849-11	s	METAL, CHIP 220K 5% 1/16W
R842	1-216-857-11	s	METAL, CHIP 1M 5% 1/16W
R843	1-216-839-11	s	METAL, CHIP 33K 5% 1/16W
R844	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R845	1-218-716-11	s	METAL 10K 0.50% 1/16W
R846	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R848	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R849	1-220-158-91	s	METAL 3.6K 5% 1/16W
R851	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R852	1-216-861-11	s	METAL 2.2M 5% 1/16W
R853	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R854	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R855	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R856	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R857	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R858	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R859	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R860	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R861	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R862	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R863	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R864	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R865	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R866	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R867	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R868	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R869	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R870	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R871	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R872	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R873	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R874	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R875	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R876	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R877	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R878	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R879	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W

(TC-86E/86G BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R880	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R881	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R882	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R883	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R884	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R885	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R886	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R887	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R888	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R889	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R890	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R891	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R893	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R897	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R898	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R899	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R901	1-216-826-11	s	METAL, CHIP 2.7K 5% 1/16W
R902	1-216-826-11	s	METAL, CHIP 2.7K 5% 1/16W
R903	1-216-826-11	s	METAL, CHIP 2.7K 5% 1/16W
R904	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R905	1-216-826-11	s	METAL, CHIP 2.7K 5% 1/16W
R906	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R907	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R908	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R909	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R911	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R912	1-216-841-11	s	METAL, CHIP 47K 5% 1/16W
R913	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R914	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R915	1-216-857-11	s	METAL, CHIP 1M 5% 1/16W
R916	1-216-855-11	s	METAL, CHIP 680K 5% 1/16W
R917	1-216-839-11	s	METAL, CHIP 33K 5% 1/16W
R918	1-216-852-11	s	METAL, CHIP 390K 5% 1/16W
R919	1-216-855-11	s	METAL, CHIP 680K 5% 1/16W
R920	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R921	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R922	1-216-861-11	s	METAL 2.2M 5% 1/16W
R923	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R924	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R925	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R926	1-216-861-11	s	METAL 2.2M 5% 1/16W
R927	1-216-843-11	s	METAL, CHIP 68K 5% 1/16W
R928	1-216-851-11	s	METAL, CHIP 330K 5% 1/16W
R929	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R930	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R931	1-216-857-11	s	METAL, CHIP 1M 5% 1/16W
R932	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R933	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R991	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
RV101	1-230-337-11	s	RES, VAR, CARBON 10K
RV102	1-238-087-11	s	RES, ADJ, 1K
RV201	1-230-337-11	s	RES, VAR, CARBON 10K
RV202	1-238-087-11	s	RES, ADJ, 1K
RV302	1-238-090-11	s	RES, ADJ, 10K
RV402	1-238-090-11	s	RES, ADJ, 10K
RV701	1-238-094-11	s	RES, ADJ METAL 220K
RV901	1-237-518-21	s	RES, ADJ, METAL 10K
RV902	1-237-518-21	s	RES, ADJ, METAL 10K

(TC-86E/86G BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
S1	1-572-855-11	s	SWITCH, SLIDE
S2	1-572-855-11	s	SWITCH, SLIDE
S3	1-570-909-11	s	SWITCH, PUSH
S4	1-570-909-11	s	SWITCH, PUSH
S5	1-570-909-11	s	SWITCH, PUSH
S6	1-572-855-11	s	SWITCH, SLIDE
S7	1-570-909-11	s	SWITCH, PUSH
S8	1-572-272-11	s	SWITCH, SLIDE
S9	1-572-272-11	s	SWITCH, SLIDE
S13	1-572-272-11	s	SWITCH, SLIDE
S14	1-572-855-11	s	SWITCH, SLIDE
S101	1-572-272-11	s	SWITCH, SLIDE
S102	1-572-342-11	s	SWITCH, SLIDE
S103	1-572-272-11	s	SWITCH, SLIDE
S201	1-572-272-11	s	SWITCH, SLIDE
S202	1-572-342-11	s	SWITCH, SLIDE
S203	1-572-272-11	s	SWITCH, SLIDE
S550	1-571-506-41	s	SWITCH, SLIDE
S701	1-572-011-11	s	SWITCH, SLIDE
S702	1-572-272-11	s	SWITCH, SLIDE
S901	1-572-272-11	s	SWITCH, SLIDE
S902	1-572-342-11	s	SWITCH, SLIDE
X1	1-579-843-11	s	CRYSTAL 4.194304MHz
X2	1-527-997-21	s	VIBRATOR, CRYSTAL 32.768kHz
X3	1-579-843-11	s	CRYSTAL 4.194304MHz
X802	1-760-429-11	s	CRYSTAL 14.5MHz

VR-210 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-657-420-11	o	PC BOARD, VR-210
CN1	1-565-875-11	o	PIN, CONNECTOR (PC BOARD) 3P
RV1	1-238-296-11	s	RES, VAR, CARBON 10K

SUPPLIED ACCESSORIES

Ref. No. or Q'ty	Part No.	SP	Description
1pc	3-679-069-01	s	COVER, SIDE CONNECTOR
1pc	3-698-917-01	o	BELT, SHOULDER
1pc	3-764-889-01	o	CHART, ADJUSTMENT
1pc	3-856-083-01	s	MANUAL, INSTRUCTION (JAPANESE)
1pc	3-856-083-21	s	MANUAL, INSTRUCTION (ENGLISH)
1pc	3-856-083-31	s	MANUAL, INSTRUCTION (FRENCH)
1pc	3-856-083-41	s	MANUAL, INSTRUCTION (GERMAN)
1pc	3-856-083-51	s	MANUAL, INSTRUCTION (ITALIAN)
1pc	3-856-083-61	s	MANUAL, INSTRUCTION (CHINESE)